

# STEM Should Be a Natural Extension of Literacy Education

The nation seems enamored with the acronym STEM, which stands for science, technology, engineering, and math.

However, according to the National Math and Science Initiative, the lack of STEM proficiency is a crisis for U.S. educators, with students finishing 25th in math and 17th in science in the ranking of 31 countries by the Organization for Economic Coordination and Development (OECD). These findings are of significant concern, of course, because essential elements of a STEM education are absolutely necessary for youth to find future employment that is enriching, rewarding, relevant and of importance in the world.

Microsoft reported in 2011 that it had engaged Harris Interactive to conduct research to determine the STEM perceptions of parents and students, and found that 49 percent of K-12 parents see STEM as a top priority, but only 24 percent would be willing to spend extra money for STEM education. The divide between the survey group's knowledge and its participants' willingness to act on that knowledge is disconcerting, especially in light of the accepted value of STEM in providing competitive advantages in life.

STEM should not be treated as a separate domain in education, but rather treated as a cross-domain strategy. In fact, the 21st century skills of collaboration, creativity, critical thinking, and communication must be infused with STEM education to provide students with the thinking skills inherently needed in STEM careers. In addition, art education should be integral, which may change the acronym to STEAM. The Harris Interactive survey actually found that parents were more willing to spend extra money on art education, and that students favored art careers over STEM, which presents a strategy for fostering STEM interest through art courses.

The Association for Supervision and Curriculum Development (ASCD) has a mandate to educate the whole child, and this mandate is shared by the American Association of School Administrators. This compact emphasizes that our students must not only learn knowledge, they should also learn strategies that foster emotional intelligence, civic awareness, accountability, and empathy for others. The Destination Imagination programming accentuates these skills, and includes perseverance strategies that teach risk taking, resilience, mindfulness, and self-determination.

As mentioned above, STEM education is not a single-domain strategy and should be integrated across all curricula to enable children to construct meaning across disciplines. STEM education can be taught through stories, pictures, sound, videos, and hands-on activities. The opportunity for educators is to use inquiry-guided learning (questioning) strategies to engage children to use their imaginations for creativity, and then use the same teaching methodology for critical thinking. This engagement could invoke emotion in the form of excitement and passion, which is a brain-based teaching strategy. A goal of STEM education should be to foster higher-order thinking skills, such as goal setting, planning/budgeting, organizing, prioritizing, memorizing, initiating/risk-taking, shifting, and self-monitoring.

Bottom line is that educators need to recognize that STEM is not a stand-alone educational strategy. STEM knowledge should be integrated across the curriculum, and schools should use after-school programs, such as the ones offered by Destination Imagination, to develop practical skills -- collaboration, creativity, critical thinking, and communication -- while fostering a sense of wonderment, which is needed for passion, perseverance, and innovation.

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