

# STEM Versus STEAM



**INNOVATION:** "21st century innovation depends on the problem solving, risk-taking and iteration that is natural to the way artists and designers think," said Rhode Island School of Design President John Maeda. "Creative thinking is required to solve the complex challenges of the day, and to communicate, energize, and engage students of all ages in this learning. Sustaining arts education in its own right remains critically important. But equally important is taking a page from schools that have been successful at integrating the arts into STEM curriculum." —*John Maeda, Founder Rhode Island School of Design*

**PERSPECTIVE:** I see two major claims. The first one refers to art as a different way of perceiving and knowing and dealing with the world, as a means to expand the toolbox of science and engineering. —*Science Blogs*

**CREATIVITY:** The second claim is based on the limitations of scientific research and of engineering design, which some see as lacking creativity and fun. Art, in this view, is a means to free the scientist's and engineer's mind. It should be noted that highly selective STEM specialty schools encourage their students to pursue the arts, be that art, poetry, music, theatre, or any other aspect of it. —*Science Blogs*



**COLLABORATION:** Two years ago, the Conference Board and Americans for the Arts, in association with the American Association of School Administrators (AASA), conducted a survey of executives and school superintendents. The study, called "Ready to Innovate," demonstrated that more and more companies are looking for skill sets in their new employees that are much more arts/creativity-related than science/math-related. Companies want workers who can brainstorm, problem-solve, collaborate creatively and contribute/communicate new ideas. While the question of whether American schools are currently teaching the arts in an adequate fashion is one that goes beyond the scope of this report, it is clear that the arts—music, creative writing, drawing, dance provide skills sought by employers of the third millennium. —*Ready to Innovate, The Conference Board and AASA*



**PASSION:** Robert Root-Bernstein, a biochemist and MacArthur prizewinner did a study of 150 biographies of eminent scientists, from Pasteur to Einstein, in the early 1990's. It dealt with this relationship between the two sides of the brain. He found that nearly all of the great inventors and scientists were also musicians, artists, writers or poets. Galileo, was a poet and literary critic; Einstein was a passionate student of the violin; Samuel Morse, was a portrait painter, etc. He and his wife, Michele, co-authors of *Sparks of Genius*, conducted extensive research into the minds of inventive people and showed that creativity can be encouraged and enhanced through the exercise of thinking tools - i.e., the right side of our brains. —*Robert Root-Bernstein, biochemist*

**IMAGINATION:** "The game is changing. It isn't just about math and science anymore. It's about creativity, imagination, and, above all, innovation." —*Business Week*

**SKILLS:** The last few decades have belonged to a certain kind of person with a certain kind of mind—computer programmers who could crank code, lawyers who could craft contracts, MBAs who could crunch numbers.

But the keys to the kingdom are changing hands. The degree of the future is the MFA, and this future belongs to a very different kind of person with a different kind of mind. These people will now reap society's richest rewards and share its greatest joys. —*from A Whole New Mind: Why Right Brainers Will Rule the Future by Dan Pink*

