

# BOSTON Herald

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## Technological literacy empowers kids

Last month the state Board of Education voted, to introduce engineering into the state's K-12 science and technology curriculum standards. This made Massachusetts the first state to make engineering part of the public school curriculum.

This new discipline — which incorporates concepts inherent in many of the tasks children already perform at school and at play — will give our kids the essential problem-solving and design skills they need to succeed in our technological world.

**Ioannis MIAOULIS**

Every time a child builds a fort out of LEGOs or a castle out of sand, he or she is using engineering skills. Engineering concepts — identifying a need, designing a workable solution, creating a finished product and communicating results to others — offer an excellent platform for project-based learning and serve as a catalyst for integrating knowledge from all disciplines, not just math and science, but language arts, humanities and social studies as well.

Just as well-educated individuals achieve general literacy about the world — for instance, they understand how volcanoes erupt or why the United States fought in World War II — so too do they need technological literacy, an understanding of how the many human-made things around them work. While televisions, computers, cars and other machines dominate our world, few people have learned how they work, yet we need this understanding in order to become fully

literate about our complex society.

Engineering provides technological literacy through emphasis on project-based learning and spatial visualization skills — skills that have become sorely underdeveloped in the media age.

Few children spend time exploring three-dimensional objects. Rather than build models, they watch TV or play computer games, sharpening their eye-hand coordination but only in two dimensions. While children certainly need good computer skills, they also need to understand how their world functions in three dimen-

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sions.

Rich in hands-on activities, a high-quality engineering education gives students opportunities to observe, formulate ideas, construct solutions and present finished products. Examples of classroom engineering projects include:

- Constructing a safe and environmentally sound living environment for the classroom pet rabbit in kindergarten.

- Exploring bioengineering and communications technologies by building simple robotic machines in middle school.

- Using math and science principles to develop sophisticated prototypes in high school.

Such learning nurtures the abilities of

the child to design and present real-world solutions and brings math, science and technology alive. It also creates connections to everyday life — a significant factor that motivates girls in particular to pursue careers in these male-dominated professions.

As the leader in bringing engineering into the K-12 public school curriculum, the Center for Engineering Educational Outreach at Tufts University has seen firsthand the success of introducing engineering at a young age. For 13 years, our successful school partnerships, teacher-training activities and classroom-outreach initiatives have shown that teaching engineering to young children enhances their math and science learning.

We have also learned that the very best way to bring engineering into classrooms is to introduce it through curriculum standards. That is why Tufts has collaborated actively with the state Department of Education. Currently, Tufts is running a pilot program in the Nashoba public schools to help teachers prepare the engineering frameworks.

We applaud the department for this historic initiative. Our state will serve as a model for districts across the country. By empowering our students with technological literacy, we will enable these future citizens to become the problem-solving innovators of tomorrow.

*Ioannis Miaoulis is dean of engineering at Tufts University.*