

Eight Benefits of Technology & Engineering Education

1. Teachers feel that students learn by doing hands-on activities in their classrooms and students are doing more hands-on activities in technology and engineering classrooms.
2. Quoting the *Phi Delta Kappa 49th Poll of Public's Attitude Towards the Public Schools*, "Students need to take more technology and engineering courses to prepare them for life".
3. Students in science, technology, engineering, and mathematics classes do activities that address the same national standards (Standards for Technological Literacy (STL), Next Generation Science Standards (NGSS), and Common Core State Standards for Mathematics (CCSSfM) in their courses. However, technology and engineering students are completing what could be considered STEM activities more frequently than are science and mathematics students. Students not enrolled in technology and engineering courses are missing opportunities to use hands-on activities that bring STEM to life.
4. Elementary Students Learn Engineering Design by Planning and Using Tools to Manipulate Materials.
5. The literature tells us that scientists, technologists, engineers, and mathematicians use some form of engineering design process to solve problems. The engineering design process involves determining and solving problems, many times by designing and making prototypes or models. Elementary students who learn and use an engineering design process will be able to use this method of doing to guide them in their future school and life experiences.
6. Designing and modeling are key components in an engineering design process. By using a design process, students, "can integrate various skills and types of thinking—analytical and synthetic". An engineering design process is a tool used by engineers, scientists, etc. Students enrolled in technology and engineering courses have more exposure to and learn by using engineering design processes. This exposure provides students with opportunities to learn and practice this valuable problem-solving tool.
7. Technology and engineering activities promote female (as well as other students') interest and participation in STEM-related education and occupations. Research shows that female students enjoy studies and occupations that directly benefit society and/or individual needs and wants. Technology and engineering courses present students (male and female) with more interesting and challenging real-world scenarios involving societal and/or individual needs and wants.
8. The LBbD Study found that the percentage of doing decreased from middle to high school in each content area during each year of this study. However, the percentage of doing decreased less in technology and engineering classrooms than it did in science and mathematics classrooms. Many students become less interested in their studies while in high school. Could there be a correlation between the decrease of doing hands-on activities and students losing interest in school? If so, technology and engineering courses could help promote secondary education students' interest and academic success.

See attached PDF Technology & Engineering Talking Points for additional details and references for the 8 points listed above.

Key Points

Technology & Engineering Education is the means by which we teach students the Technology and Engineering components of Science, Technology, Engineering, and Mathematics (STEM) education which is found in the ***Pennsylvania Academic Standards for Science and Technology***, [Science and Technology](#) (PDF).

Technology Education is a body of knowledge *separate from but related to the sciences*, with specific content, curriculum and specific certification requirements.

The relationship between science and technology is one where science builds principles or theories and technology provides the practical application of those principles or theories to produce human made products and systems to improve our lives.

Technology Education offers unique opportunities to apply numerous academic concepts through practical minds-on/hands-on applications giving these academic concepts relevance.

Technology Education involves a broad spectrum of knowledge and activities. Effective Technology Education combines knowledge of content, processes and skills to provide students with a holistic approach to learning.