



## Abstract

# Spatial Skills: A Focus on Gender and Engineering



By

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Strong spatial-visualization skills, particularly the ability to visualize in three dimensions, are cognitive skills that are linked to success in science, technology, engineering, and mathematics (STEM) fields. Well-developed math and verbal skills are recognized as necessary for success in STEM and the National Science Board maintains that spatial skills should be added to this list. Unfortunately, significant gender disparities exist on spatial-skills test performance and are most evident in mental rotation, an important skill in engineering. Poor performance on spatial-visualization tasks can directly affect perceptions of self-efficacy, especially in women and individuals from lower socioeconomic groups.

The literature overview covers the following topics:

- Definition of spatial skills
- Gender differences
- Spatial-skill ability and success in engineering
- Methods for assessing spatial skills
- Enhancing spatial-skills development: Recommendations for engineering schools
- Enhancing spatial-skills development: Recommendations for practitioners

The preponderance of evidence asserting the connection between spatial-skills development and success in engineering provides strong support for engineering schools to assess students' spatial skills and remediate accordingly. Recent research results provide faculty and other practitioners with strong evidence to counter arguments of overcrowded curricula and limited resources. Spatial skills, like other cognitive skills, are malleable, can be learned, and respond well to training.

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