The Role of Spatial Ability in Engineering

- Engineering functions as a linking subject that can make connections with other subjects while engaging students in design activities.
- Engineering is a spatial subject that enables students who have spatial strength to reveal their talent and students who have spatial weakness to nurture spatial aptitude.
- Engineering frequently involves a high volume of spatial tasks (Hsu, Linn, & Bell, 1997).
- Spatial thinking necessarily occurs either latently or overtly during engineering activities.
- In addition to subject knowledge, spatial ability has been considered one crucial dimension of successful performance in engineering (Contero, Naya, Company, Saorin, & Conesa, 2005; Field, 2007).

Current Status of Engineering Education in K-12

- The current K-12 curriculum was set up in 1892 to focus on the understanding of the natural phenomena and has not been changed to address human activities, i.e., engineering & technology (Maisolis, 2005).
- As the United States has faced a shrinking engineering workforce, the importance of K-12 engineering education has recently been emphasized (Houston, 2006; Katehi, Pearson, & Feder, 2009; Miaoulis, 2005).
- As the United States has faced a shrinking engineering workforce, the importance of K-12 engineering education has recently been emphasized (Houston, 2006; Katehi, Pearson, & Feder, 2009; Miaoulis, 2005).
- Today’s curricula do not include enough opportunities to develop spatial ability (Webb, Lubinski, & Benbow, 2007). Engineering is an area full of spatial tasks, so engineering provides students with opportunities to reveal and nurture their spatial ability.
- Current schools’ environments undermine spatially gifted students’ potential to excel (Mann, 2005) as well as withhold opportunities to develop spatial ability from non-spatially gifted students.

Engineering Design

- Although engineering has been one of the most attractive majors for gifted students at the college level, there is a critical need for students to enter this field. Corresponding to the significant roles of spatial ability in engineering education, the present article reviewed literature on spatial ability of gifted students, and research results on spatial ability.
- Furthermore, by understanding distinct characteristics of spatial and non-spatial learners, we suggested several guidelines to promote educators’ understanding of spatially diverse students’ engineering learning in class. Visual and technical communication abilities are necessary and imperative for most jobs at present, and even more so for the future. A concentration on visual literacy situated in engineering activities will benefit all gifted students, whether or not they will choose engineering for future career.