Educational Research in Developing 3-D Spatial Skills for Engineering Students

The ENGAGE Program is an Extension Services project funded by the National Science Foundation. The University of Maryland at College Park is one of the 10 participating Universities to develop research-based strategies into STEM education.

1. **Assessment of the ability of spatial skills**

   **Answer**
   - Rotated about x axis 90°
   - Rotated about y axis 90°
   - Rotated about z axis 90°
   - Rotated about x and y axis 90°
   - Rotated about y and z axis 90°

   In summer 2010, 636 freshman students took the assessment test with 10 questions.

   ![Bar Chart](chart1)

   - 361 students scored 100-80
   - 204 students scored 80-60
   - 53 students scored 60-40
   - 20 students scored 40-0

   Average: 82.64/100

2. **A one-credit course on spatial visualization**

   **Part 1: Use cubes to construct solids**

   ![Cubes](image1)

   - (a)
   - (b)
   - (c)
   - (d)

   **Part 2: Practice using spatial visualization examples**

   ![Spatial Visualization](image2)

   - is rotated to

   **Part 3: Learn CAD systems for engineering problem solving**

   ![CAD Systems](image3)

3. **Learning Outcomes**

   The class was useful, engaging and interesting. I have now mastered the skill of spatial visualization, and gained priceless knowledge needed for my major. -David Novy

   I have greatly improved up my skills in visualizing 3dimensional objects that are shown in 2 dimensional drawings… I found this course to be very helpful and fun. I would recommend that all first year engineering students take it. -Rachel Ellison

4. **Acknowledgements**

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