Increasing STEM Student's Performance: Using Models to Improve Visualization

Urdarevik, Slobodan
Western Michigan University

INCREASING STEM STUDENTS' PERFORMANCE: USING MODELS TO IMPROVE VISUALIZATION SKILLS

By

Slobodan Urdarevik
Western Michigan University

Synopsis

One of the biggest problems engineering students are facing is visualization. In order to help students to improve this skill and make teaching and learning more productive and interesting, I have developed a teaching strategy based on using models. Experience in using models shows significant improvements in student performances.

INCREASING STEM STUDENTS' PERFORMANCE: USING MODELS TO IMPROVE VISUALIZATION SKILLS

Slobodan Urdarevik
Western Michigan University

ABSTRACT

Performances of U.S. students in Math and Science in International competition when compared to the other nations and the rate of STEM degree attainment appear inconsistent with a nation considered the world leader in scientific innovation. For example, among the 34 counties participating in the 2012 Program for International Students Assessment (PISA), the U.S. ranked 26th in math literacy and 21th in science literacy compared to 28th in math and 24th in science in 2009.

Moreover, the U.S. currently ranks 20th among all nations in the segment of 24-year-olds who earn degrees in natural science or engineering.

Although the most recent National Assessment of Education Progress (NAEP) results show improvement in U.S. students' knowledge of math and science, the large majority of students still fail to reach adequate levels of proficiency.

In order to increase performances of our students on an international stage, the STEM program was established, and works hard on many different fronts. The Department of Education as well as many other entities (Universities, private companies and others) have made our students to perform better. Can we, and should we, do more to make the results even better? In my opinion, yes and I think there are several different areas that we can make significant improvements.

For example, one of the biggest problems engineering students are facing is visualization. Without that ability to visualize engineering problems, students quickly find comprehending engineering topics to be very difficult. In order to help students to develop this skill as well as make teaching and learning more productive and interesting, I have developed a teaching strategy based on using models that I have created. Experience in using models shows significant improvement in student performances in engineering graphics and other subjects.