

DE05 2:30 p.m. Relationship between Mathematics Preparation and Conceptual Learning Gains

David E. Meltzer, Iowa State Univ., Dept. of Physics and Astronomy, Ames, IA 50011; 515-294-9358; dem@iastate.edu

I have examined the correlation between students' pre-instruction scores on tests of mathematics skills and their conceptual learning gains as measured by the Conceptual Survey in Electricity (CSE). Four separate student samples were examined, all from the second semester of algebra-based introductory courses utilizing "interactive engagement." In two cases, ACT math scores were used. In the other two cases, an algebra skills test administered 5-18 months pre-instruction was employed. In all four cases there was no correlation between CSE pre-test scores and overall learning gains as measured by Hake's "g". However, in three of the four cases there was a large and highly significant correlation between math pre-test scores and normalized learning gains. Although I believe it is unlikely that there is a causative relationship between math skill and conceptual learning gains, these results may have significant implications regarding interpretations of learning gains on other diagnostic instruments.