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### **Collaborative Group Learning using the SCALE-UP Pedagogy**

GERALD FELDMAN, George Washington University

The time-honored conventional lecture (“teaching by telling”) has been shown to be an ineffective mode of instruction for science classes. In these cases, where the enhancement of critical thinking skills and the development of problem-solving abilities are emphasized, collaborative group learning environments have proven to be far more effective. In addition, students naturally improve their teamwork skills through the close interaction they have with their group members. Early work on the Studio Physics model at Rensselaer Polytechnic Institute in the mid-1990’s was extended to large classes via the SCALE-UP model pioneered at North Carolina State University a few years later. In SCALE-UP, students sit at large round tables in three groups of three — in this configuration, they carry out a variety of pencil/paper exercises (ponderables) using small whiteboards and perform hands-on activities like demos and labs (tangibles) throughout the class period. They also work on computer simulations using a shared laptop for each group of three. Formal lecture is reduced to a minimal level and the instructor serves more as a “coach” to facilitate the academic “drills” that the students are working on. Since its inception in 1997, the SCALE-UP pedagogical approach has been adopted by over 100 institutions across the country and about 20 more around the world. In this talk, I will present an overview of the SCALE-UP concept and I will outline the details of its deployment at George Washington University over the past 4 years. I will also discuss empirical data from assessments given to the SCALE-UP collaborative classes and the regular lecture classes at GWU in order to make a comparative study of the effectiveness of the two methodologies.