

Evaluating Flipped Classroom's Influence on Learning Gains and Environments.

The University of South Florida is the lead institution (along with Arizona State University, University of Pittsburgh and Alabama A & M University) on a three-year (2013-2016) [National Science Foundation funded award](#) for conducting research on the effectiveness of flipped classrooms for higher education STEM courses such as Numerical Methods. In addition, the group will develop best practices for teaching in a flipped as well as in a hybrid fully guided instruction classroom.

USF Mechanical engineering [Professor Autar Kaw](#), the lead principal investigator of the grant of the



Department of Mechanical Engineering, is a thought leader on the use of classroom technology in blended environments. In a flipped classroom, students first study the topic themselves typically using video lessons. But in the funded study, open courseware textbooks, simulations, and instructor-monitored discussion boards are also used. A flipped classroom frees up the in-class time for open discussion, micro-lectures, higher order thinking exercises, hands-on work, short experiments, and peer-to-peer interactions.

The present [open courseware resources](#) used in the study are a product of four previous NSF grants (2002-2012) for which Kaw was the lead principal investigator. His website currently receives more than 1 million page views/year and 800,000 YouTube views/year while being used in more than 35 institutions. This grant is expanding its impact on STEM education by ensuring that all materials are developed for and work well with diverse student populations. The focus of the assessment efforts is on under-represented minorities, non-traditional students including community college transfers, over-traditional-age adults, part-time students, and diverse STEM majors.