APR17-2016-000293

Abstract for an Invited Paper
for the APR17 Meeting of
the American Physical Society

The Impact and Promise of Open-Source Computational Material for Physics Teaching

WOLFGANG CHRISTIAN, Davidson College

A computer-based modeling approach to teaching must be flexible because students and teachers have different skills and varying levels of preparation. Learning how to run the "software du jour" is not the objective for integrating computational physics material into the curriculum. Learning computational thinking, how to use computation and computer-based visualization to communicate ideas, how to design and build models, and how to use ready-to-run models to foster critical thinking is the objective. Our computational modeling approach to teaching is a research-proven pedagogy that predates computers. It attempts to enhance student achievement through the Modeling Cycle. This approach was pioneered by Robert Karplus and the SCIS Project in the 1960s and 70s and later extended by the Modeling Instruction Program led by Jane Jackson and David Hestenes at Arizona State University. This talk describes a no-cost open-source computational approach aligned with a Modeling Cycle pedagogy. Our tools, curricular material, and ready-to-run examples are freely available from the Open Source Physics Collection hosted on the AAPT-ComPADRE digital library. Examples will be presented.