Using Spreadsheet Technology to Assess and Promote Learning in Physics

Abstract

“College Physics” is an algebra based physics course that serves as the foundation physical science course for most incoming science, engineering and technology students. The course covers the laws and methods of physics and introduces students to the techniques needed to interpret, set-up and solve problems using elementary algebra. With these broad objectives and diverse student mix, “College Physics” can benefit greatly from teaching and learning methods that can rapidly identify student weaknesses, and can customize instruction in real-time to meet these identified needs.

To accomplish this we have introduced a system that utilizes spreadsheet based student assignments in a manner that allows for self-assessment, deficiency identification and resolution, and long term storage and retrieval of the resultant student-generated knowledge. The assignments and their associated spreadsheets not only help the student learn the materials and techniques required in a personalized way, but also provide a vehicle for monitoring progressive understanding, and easily documenting the acquired knowledge.

These methods have been applied in actual classroom settings. Student progress has been monitored using an assessment grid modeled after ABET, the international certification agency for engineering and technology curricula. Preliminary findings support our expectation that customized real time assessment, and easy access to a student generated learning outcomes improve learning and retention.