Power Point Based Teaching Modules

Raphael T. Haftka, University of Florida, Gainesville, Florida, USA 32611

Microsoft Power Point has become a popular medium for teaching engineering courses, especially graduate courses. Preparing a good set of slides for a lecture usually requires more time than prepping for teaching the class from a blackboard. However, updating a set of slides the second time the course is taught often requires little effort, and this compensates for the large initial investment.

In addition, Power Point slides prepared for one course can be recycled in part for other courses, since it is common for courses to have some degree of overlap. For example, I teach two optimization courses, Engineering Optimization and Structural Optimization, and these have substantial overlap. I estimate that I can use about 30% of the slides from the Engineering Optimization course in the Structural Optimization course.

The latest versions of Power Point make it easy to record voice into the slides without creating huge files (a problem with earlier versions). I like this feature because it allows me to edit not only the written material on the slide but also the audio. I can just improve the delivery of a lecture by listening to myself and re-recording the voice part of any slide. The proposed paper will describe classroom experience with Power Point lectures with audio, and suggest a further usage of such material for providing students and practicing engineers with short teaching modules on individual topics.

When teaching from slides, I interrupt the continuous flow of the lecture by asking students questions that probe their understanding of the material. I also encourage them to interrupt me with questions. On average about half of the class time is taken by these questions and answers. When I record my voice into the slides, I find that editing further shortens the duration of the lecture part, so that material for a 50 minute class is compressed into 15-20 minutes.

Teaching the graduate Engineering Optimization last semester, I posted the Power Point slides with audio on the course web page the day before the lecture. I provided the students with bonus points for listening to the lecture ahead of class time and emailing me questions about the material. On average, I received questions from 2-3 students from a class of 12. During class I played one or two slides at a time, answered questions received by email, solicited additional questions, and I also asked the students questions to assess their understanding.

Judging by the course evaluation and verbal and written student comments, this experiment with pre-recorded material proved to be a success. I also was very satisfied with the student performance compared to previous years. The proposed paper will discuss more in depth the classroom experience and the reaction of the students.

The success of this approach encouraged me to take a second step intended to make the material useful for online learning. I am revising the slides to make each lecture self contained by making sure that all symbols and terminology is defined and some material from previous lectures is duplicated (duplicated slides can be easily skipped by the student). In addition, I write additional information into the notes page, such as derivations and Matlab commands used to produce the examples. The proposed paper is intended to prompt a discussion of this approach to teaching and the desirability of creating an archive of slides from contributions of the entire community of optimization teachers.