



NSF Award Abstract - #0243258

Formative Assessment Materials for Large-Enrollment Physics Lecture Classes

NSF Org DUE

Initial Amendment Date February 7, 2003

Latest Amendment Date February 7, 2003

Award Number 0243258

Award Instrument Standard Grant

Program Manager Theodore W. Hodapp

DUE Division of Undergraduate Education

EHR Directorate for Education & Human Resources

Start Date July 1, 2003

Expires June 30, 2006 (Estimated)

Awarded Amount to Date \$104914

Investigator(s) David Meltzer dem@iastate.edu(Principal Investigator)

Sponsor Iowa State University

1138 Pearson Hall

Ames, IA 50011 515/294-5225

NSF Program(s) CCLI - ASA

Field Application(s) 0000099 Other Applications NEC,

0116000 Human Subjects

Program Reference Code(s) SMET,9178

Program Element Code(s) 7431

Abstract

This project is developing new formative assessment materials for large introductory lecture-based general physics courses. Among the project goals are to (1) analyze the reliability and validity of these materials, (2) evaluate their effectiveness in the process of instruction, and (3) acquire baseline data regarding student performance that will be of value to other instructors who make use of the materials. The assessment materials themselves consist of carefully sequenced sets of multiple-choice questions, each focused on a specific topic. The individual items are primarily conceptual questions that downplay algebraic manipulations, and instead make heavy use of diagrammatic, graphical, and pictorial elements. The materials are intended for use in large lecture classes, and they are specifically designed to allow for rapid and reliable assessment of student learning during the course of a single class. The structure and sequencing of the questions are formulated to maximize intense student-instructor interaction on a minute-by-minute basis even in large-enrollment classes. The materials will be used in classes organized along active-learning lines in which a classroom communication system is available.

This type of system, either electronic or one based on flash cards, allows students to rapidly signal multiple-choice responses to questions posed by the instructor. The instantaneous feedback they provide will allow instructors to make immediate alterations, as needed, in their presentations and in planned instructional activities. The materials and baseline data gathered from these materials will be made available via websites, CD-ROMs and through other dissemination methods to reach the education community and other interested audiences.

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