PHYS 113B: Introductory Physics for the Life Sciences

Students struggle to build structured knowledge from textbook reading, as well as setting up integrals to calculate fields and forces in electrostatics.

Students created and revised concept maps\textsuperscript{1,2} representing their understanding of the relationships among concepts. A video tutorial was also provided to enhance instruction on calculating electric fields.

Concept maps\textsuperscript{3}, in-class clicker questions, homework assignments, exam questions, and pre-/post-module Concept Survey of E&M.

1. Module was effective in positively shifting distribution of student performance. It should be continued.
2. Students identified 2 out of 3 expert concepts. Instructor should emphasize “Electric Force.”
3. Strong performance correlated with specific concept links. Instructor should focus on these conceptual connections.

Effectiveness

Results: Trends in Conceptual Learning

Concept Map Features that Corresponded with Strong Performance:
- Circular Connection of Three Key Concepts: Charge, Force, and Field (Fig. A)
- Direct Connection of Superposition to Electric Field Equations (Fig. B)

Conclusions

Blended Online Learning Module

Assessment Data

Key Concepts Identified in Student Concept Maps

A video tutorial was also provided to enhance instruction on calculating electric fields.

Graph showing Distribution of Exam Grades

References