

Product Name MasteringChemistry

Course Name Physical Chemistry I and II

Credit Hours Three

Key Results Students practice more problems, come to class better prepared, and score higher on exams.

Text

Physical Chemistry, 2e, Thomas Engel and Philip Reid

Implementation

Physical Chemistry I and II is a two-semester sequence covering quantum chemistry and molecular orbital theory, thermodynamics and statistical mechanics, kinetics and reaction dynamics, and spectroscopy. The sequence is taken primarily by chemistry majors. A one-credit lab is taken concurrent with Physical Chemistry II.

I had two problems in both General Chemistry and Physical Chemistry: lack of teaching assistants (TAs) and lack of time to grade homework and provide individual assistance to students. I first used MasteringChemistry in General Chemistry and I loved it immediately. It provided my students with feedback and graded homework that they wouldn't otherwise get in these courses, particularly without TAs.

I assign one prelecture MasteringChemistry assignment a week. Assignments comprise a mix of tutorial and end-of-chapter questions. Since the homework is automatically graded and students receive feedback as they work through the problems, students come to class better prepared and with a clearer understanding of what they know and what they don't know.

In addition, the gradebook's diagnostics help me identify the concepts students struggle with the most, so I can cover them in more detail during lecture. I also assign problems in MasteringChemistry that address concepts important to future success, but that I don't have time to cover in class.

Assessments

50 Percent	Exams (four)
30 Percent	Final exam
10 Percent	MasteringChemistry homework
10 Percent	Quizzes

Results and Data

I analyzed the course results for both Physical Chemistry I and II before and after implementing MasteringChemistry and found the following:

- For the final course grade for Physical Chemistry I, there was a combined seven percentage point increase in As and Bs (see figure 1). Every Physical Chemistry II student earned a final course grade of A, B, or C.
- The average MasteringChemistry score for students earning an A on the final exam in Physical Chemistry I and II was 96 percent and 94 percent, respectively.
- The average MasteringChemistry score for students earning an F on the final exam in Physical Chemistry I was 62 percent.

“[After implementing MasteringChemistry] every Physical Chemistry II student earned a final course grade of A, B, or C.”

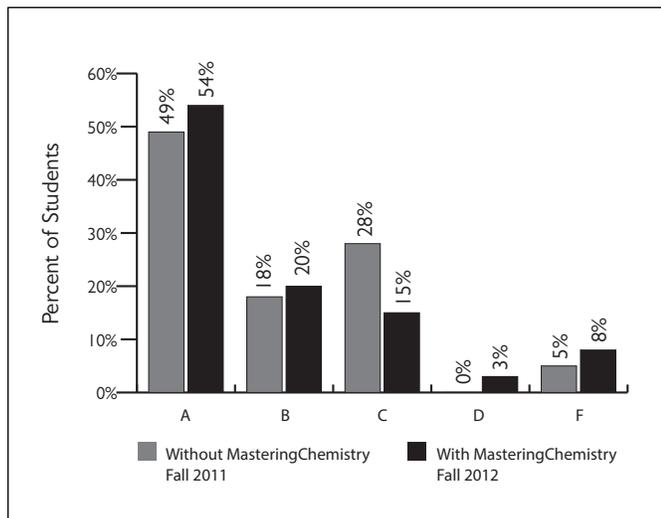


Figure 1. Physical Chemistry I Course Grade Distributions (Fall 2011 $n=39$, Fall 2012 $n=39$)

The results also show that more students earned an A, B, or C on the final exam in both Physical Chemistry I and II; no students earned lower than a C in Physical Chemistry II.

- 82 percent of students earned an A/B/C on the final exam in Physical Chemistry I with MasteringChemistry compared to 72 percent of students who earned an A/B/C without MasteringChemistry.
- 100 percent of students earned an A/B/C on the final exam in Physical Chemistry II with MasteringChemistry compared to 91 percent who earned an A/B/C without MasteringChemistry.

The Student Experience

Students report that they like using MasteringChemistry for homework and that the program's interactive tutorials and immediate feedback help them stay focused on what they need to study.

Conclusion

Frequent problem-solving practice with feedback is critical to student success. Since MasteringChemistry grades the homework and provides error-specific feedback, I'm able to offer students more opportunities to practice, to identify the content they need to study, and to learn the content I'm not able to cover in class.

*Submitted by Nathan Hammer
University of Mississippi*