

MasteringChemistry

School Name [Montgomery County Community College, Blue Bell, PA](#)

Course Name [General Chemistry I](#)

Course Format [Lecture and lab](#)

Key Results After implementation of MasteringChemistry, the percentage of students earning a final course grade of A or B increased, and the percentage of students earning a D/F/W decreased.

Submitted by

Laura McAtee, Assistant Professor of Chemistry

Course materials

Fundamentals of General, Organic, and Biological Chemistry (Custom Edition), McMurry, Ballantine, Hoeger, and Peterson

About the Course

Montgomery County Community College is a two-year public college serving Montgomery County, Pennsylvania. The school's curriculum includes more than 100 associate degree/certificate programs, and more than 70 percent of its graduates with associate degrees successfully transfer to a four-year college or university. Approximately 27 percent of the student body comprises ethnic and racial minorities, the average student age is 25, and 65 percent of all credit students are enrolled part time, with many of them attending evening classes.

General Chemistry I is designed to acquaint liberal arts majors with the fundamental facts, principles, and techniques of chemistry. The course also is taken by students preparing to enter the dental hygiene, nursing, and medical laboratory technician programs. The course focuses on chemistry applications in modern life and has both a lecture and lab component.

Challenges

In 2010, I was asked to develop a hybrid section of the course. I was looking for a solution that would enable me to easily assign online graded homework for this new course format, so I evaluated MasteringChemistry and all of its resources.

The diversity of our student body means that my classes often represent a wide range of skills and that some students will need additional remediation to succeed. The majority of my students are nursing students, many of whom are nontraditional, working students. General Chemistry I is a prerequisite for these students, so it is critical that they do well in it—they must have a B average in all of their required science courses to be admitted into the nursing program.

I implemented MasteringChemistry in both my hybrid and face-to-face classes because I felt that the resources would benefit all students taking the course.

Implementation

Students complete nongraded, paper-and-pencil homework assignments that include approximately 50 problems from the chapter, including in-chapter and end-of-chapter problems. I assigned this type of homework both before and after adopting MasteringChemistry. I expect students to work these problems on paper and bring questions to class, especially if they were not able to gain understanding from the solution manual. Although it is not graded, these homework assignments are designed to help students think independently, identify concepts they need to work on, and prepare for exams.

Some students put off work until they're so far behind they can't catch up. Regular engagement with MasteringChemistry keeps these students from falling behind. They can practice regularly, take quizzes as often as they like before the due date, and work anywhere with online access.

For each chapter, I also assign a required MasteringChemistry homework quiz. Students are allowed multiple attempts to complete the quizzes, which are graded and are due one week after completion of the chapter. Quiz problems typically comprise 8–10 tutorials and randomized questions, with some tutorial problems having multiple parts. These quizzes offer students an opportunity to test themselves and receive hints, and serve to reinforce chapter concepts that are necessary for future success.

In addition, I encourage students to use the study area of MasteringChemistry for each chapter, and emphasize the benefit of attempting multiple-choice practice problems that they have not seen before.

Some students put off work until they're so far behind they can't catch up. Regular engagement with MasteringChemistry keeps these students from falling behind. They can practice regularly, take quizzes as often as they like before the due date, and work anywhere with online access.

I use the diagnostics in MasteringChemistry to assess student performance: to identify what topics students are struggling with and which students are at risk.

Assessments

57.13 percent Exams (4)

14.29 percent Comprehensive final exam

14.29 percent MasteringChemistry quizzes

14.29 percent Lab

Results and Data

I evaluated student success rates for the traditional section and discovered that there was a significant increase in students who earned an A or B in the course over prior semesters when MasteringChemistry was not in use. In addition, the D/F/W rate was 15 percentage points lower than the prior semester without MasteringChemistry (figure 1).

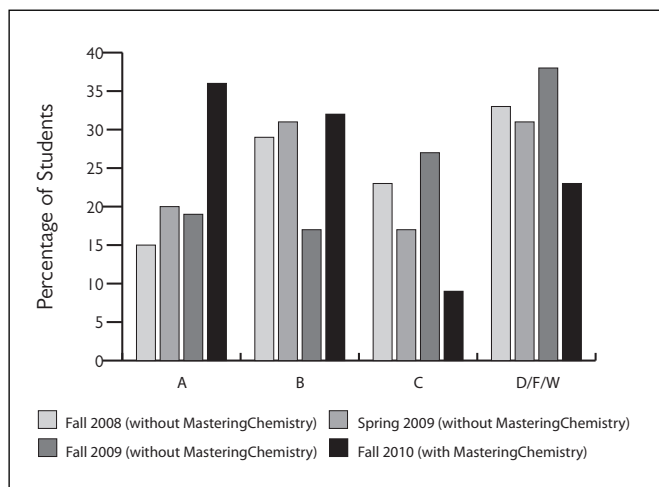


Figure 1. General Chemistry Grade Distribution, Fall 2008, Spring 2009, Fall 2009, and Fall 2010 (Fall 2008, $n=48$; Spring 2009, $n=70$; Fall 2009, $n=48$; Fall 2010, $n=22$)

The Student Experience

Students use MasteringChemistry to help them learn and to identify areas they still need to study. They give me positive feedback about the program, including that they like its additional study resources.

Conclusion

MasteringChemistry enables students to engage with course content on a regular basis outside the classroom, to test their knowledge, and to gain a better understanding of what they need to work on. Rather than relying on their first exam scores, MasteringChemistry offers them an earlier opportunity to remediate and the resources they need to do it. As a result, more General Chemistry I students earned an A or B from their first semester of use.

Based on the success of this pilot, we will continue to expand the use of MasteringChemistry throughout the chemistry department and will continue to monitor and report results to better understand the impact on student learning.