



Pearson

# Mastering Chemistry

## Efficacy Report Summary

Mastering Chemistry is an online tutorial system featuring hints and targeted wrong-answer feedback, which is used in higher education chemistry courses to help students achieve mastery of core chemistry concepts, problem-solving skills and quantitative reasoning.

### Study 1:

#### ***Is usage of Mastering Chemistry associated with higher course grades and exam results?***

We commissioned SRI International, an independent, nonprofit research center to collaborate with a highly selective research university on a study. This study examined students' usage in Mastering Chemistry for their Fall 2016 semester and Winter 2017 semester General Chemistry courses.

### What we found

SRI found that the number of problems attempted by students in Mastering Chemistry was positively and significantly related to final exam score and total course grades after controlling for student's prior achievement, age and gender.

**In the context of the study conducted at a highly selective research university, where Mastering Chemistry was used by students enrolled in the Fall 2016 and Winter 2017 semesters of General Chemistry, Pearson is able to make the following statements about the efficacy of Mastering Chemistry:**

- In Fall 2016, making 20 additional problem attempts was associated with a 1 percentage-point increase in final exam scores.
- In Fall 2016, making 30 additional problem attempts was associated with a 1 percentage-point increase in total course scores.
- In Winter 2017, making 24 additional problem attempts was associated with a 1 percentage-point increase in final exam scores.
- In Winter 2017, making 30 additional problem attempts was associated with a 1 percentage-point increase in total course scores.

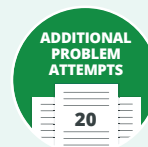
*These statements are set out in full in the box titled "Efficacy statements" on page 13 of the Research Report where they have been subject to assurance by PwC, whose report can be found at the end of the Research Report.*

### How we did the research

We examined relationship between the level of students' use of Mastering Chemistry and achievement outcomes, after controlling for students' baseline characteristics. The level of Mastering Chemistry usage by students was captured by the number of unique problems attempted.

### Key findings

#### Fall 2016



#### Winter 2017



## Study 2:

### ***Is usage of Mastering Chemistry associated with students getting better course grades and exams results?***

We also asked SRI to collect and analyze data from Ohio State University (OSU) — a primarily residential, land-grant public university known for academic research in science — of students enrolled in General Chemistry I and II courses during the Fall 2016 semester and the Spring 2017 semester.

SRI compared outcomes between two groups of students enrolled in these General Chemistry courses: one group using Mastering Chemistry, and one using Sapling, a Macmillan Education product. In addition, they also analyzed the relationship between student usage of Mastering Chemistry and course outcomes.

## What we found

When examining the relationship between Mastering Chemistry usage and achievement for the Mastering Chemistry group, there was a significant association between Mastering Chemistry use and students' performance in the course, after controlling for students' prior achievement, gender, and age.

In particular, the number of problems attempted was positively and significantly related to final exam scores, total course grades and binary grades (pass/fail) in both the Fall 2016 and Spring 2017 semesters.

In the Fall semester 2016, for three of the outcome measures examined (final exam scores, course grades, and binary grades) usage of Mastering Chemistry was significantly associated with better outcomes than was usage of Sapling. This was after students' prior achievement, gender, and age were controlled for in the analysis.

In the Spring semester 2017, for two of the three outcome measures examined, usage of Mastering Chemistry was significantly associated with better outcomes on course grades and binary grades than was usage of Sapling. This was after controlling for selected student characteristics.

### **In the context of the study conducted at Ohio State University for students enrolled in General Chemistry I and II, Pearson is able to make the following statements about the efficacy of Mastering Chemistry:**

- In Fall 2016, use of Mastering Chemistry was associated with higher course performance than was use of Sapling in terms of final exam scores (7% increase in percentile rank for an average student in the Sapling group), course grades (5% increase in the percentile rank for an average student in the Sapling group), and binary grades (pass/fail) (2% increase in the percentile rank for an average student in the Sapling group).
- In Spring 2017, use of Mastering Chemistry was associated with higher course performance than was use of Sapling in terms of course grade (20% increase in the percentile rank for an average student in the Sapling group) and binary grades (17% increase in the percentile rank for an average student in the Sapling group).
- In Fall 2016 and Spring 2017, when controlling for student prior achievement and demographic characteristics, the number of problems attempted was significantly and positively related to final exam scores, course grades, and binary grades (pass/fail).

*These statements are set out in full in the box titled "Efficacy statements" on page 18 of the Research Report where they have been subject to assurance by PwC, whose report can be found at the end of the Research Report.*

## How we did the research

SRI measured usage by looking at the number of attempts students made at Mastering Chemistry problems. They examined the outcome measures — final exam scores and course grades — as an indication of student achievement.

Explore the full report at [Pearson.com/corporate/efficacy-and-research](https://www.pearson.com/corporate/efficacy-and-research)

## Pearson's Efficacy Commitment

In 2013, Pearson made a commitment to efficacy: to identify the outcomes that matter most to students and educators, and apply evidence-based approaches to product design, development and implementation support so we could have a greater impact on improving those outcomes. We committed to reporting on the impact of use of products, commencing in 2018 with some of our most frequently used products.

To Pearson, efficacy is more than a commitment to report on the impact of use of our products on outcomes. It is even more than a way to continuously improve our products. Efficacy is a priority for everyone at Pearson. Applying outcomes-focused, evidence-based design to our products, and supporting educators to use them to help more learners learn more, is at the heart of who we are, what we do — and of our vision for the future of learning.