

New studying method improves microbiology students' grades

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Katriana Popichak teaching MIP 300. She uses the U-Behavior studying method developed by James Folkestad. Credit: Colorado State University

A new studying method has improved Colorado State University students' grades in Intro to General Microbiology by about a letter grade,

according to CSU education Professor James Folkestad, the director of the Center for the Analytics of Learning and Teaching (C-ALT).

The [U-Behavior system](#)—which Folkestad says could be employed in any class—ironically improves grades by using quizzes that only track progress instead of grading answers.

"We sort of targeted (MIP 300) because, for one, the instructors were extremely interested in what we were proposing and, also, it's just a difficult class," Folkestad said. "Most people who have taken microbiology will attest to that. A lot to know; a lot to learn; a lot to digest. So, we were looking for a difficult, challenging course on our campus that we could put this into and that one stood out, so we started there."

The letter grade improvement has been consistent across multiple semesters, so Folkestad said there was not just one class of superstar students. This past semester, he expanded the practice to include courses in geology, psychology and computer science.

"We're ramping up and trying to bring other classes on board in subsequent semesters, including physics," Folkestad said of his unique system that expanded from 200 students to about 2,000 in Spring 2022. "A couple courses ran that weren't quite prepared" with the onboarding process, so Folkestad said that will be tweaked.

What is U-Behavior?

Folkestad said 40 to 50 years of research on learning has not led to successful implementation of behavioral changes to help students realize success by adopting better studying habits. He took the challenge head on.

"U-Behavior was designed over 3.5 years of tinkering," Folkestad said. "It includes visualizations (correlating practice and performance) that seem to really resonate with students, and they start changing their behaviors."

On a CSU webpage, U-Behavior is described as a learning and teaching method that uses the Canvas quiz tool to promote optimal [student](#) study behaviors and practices.

After two or three classes/sections/lessons, students take quizzes—referred to as Retrieval Practice Activities or RPAs—about a suite of concepts. They can retake an RPA, but the questions and answers change.

"I thought it was really exciting and it kind of seemed almost sort of simple, philosophically-wise," said Jennifer McLean, one of the MIP 300 instructors, "but to put it into practice and get students to actually change their behavior, that's a whole other story."

No grades, but spaced out studying

McLean and Katriana Popichak, who is teaching three sections of MIP 300 this semester, agreed that a key to the method is not grading the RPAs.

"I think I was originally skeptical from the perspective of students—usually by the time they hit this point in their undergraduate career in their academics—I at least hope they have the majority of their studying sort of figured out," said Popichak, who added that she was worried until they decided not to grade the quizzes. "That was when I was especially excited about it, because it gives the students an opportunity to truly practice and focus on the studying side of it rather than them purely chasing points for correctness."

Folkestad said most fellow professors have been receptive to incorporating U-Behavior into their classes. He said the results point to improvement across the spectrum of learners, who space out their studying throughout the semester.

He said some students are better than others at cramming for a test. But Folkestad added that just because students can "regurgitate it on an exam" and then forget it is not an education.

"What is learning?" he said. "You really haven't learned anything if you can't recall it."

A student perspective

Brandon Lowry is a first-generation, older-than-average undergraduate who twice started and stopped college due to non-educational issues. He liked the U-Behavior concept right away in MIP 300.

"It was the first time I ever encountered this sort of activity or engagement. It was very different as opposed to like the busywork that I've gotten before," Lowry said. "This seemed geared towards ... [behavioral changes](#) that seemed to have a purpose or an intention behind it."

Lowry said a colorful, aesthetically pleasing graph shows patterns and trends of studying and how those affect the grade.

Lowry did well on the first two exams and—distracted by extracurricular issues—dipped on the third when he did not follow the U-Behavior model.

"There's a lot of reflection built into it," he said. "It doesn't matter if you get them right or wrong. It's just that you're doing them. You do want to

see an upward trend in your scores."

A courageous strategic transformation

McLean said most students embrace the system.

"It's learning how to learn well," she said. "I would like to see it start in that freshman introductory course to our major and then we continue it ... I can see it working. I can see faculty adopting it and wanting to do it."

Lowry is on track to graduate in Fall 2022 with a degree in biomedical science. He hopes to get a Ph.D. and teach anatomy, perhaps utilizing Folkestad's method.

He said the system could work across campus. "I think it would be incredibly valuable," Lowry said. "I think it's a unique way of teaching and encouraging student learning."

Changing how an entire university learns seems to fit CSU President Joyce McConnell's Courageous Strategic Transformation's goals of interdisciplinary, experiential and collaborative education.

"The idea is really transforming student behavior from the time they enter until the time they leave," Folkestad said. "And really changing just how they orient to learning and how they behave around learning. That would be amazing. That would be the goosebump moment."

Provided by Colorado State University

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