



Biology professor Kelly Hogan leads University of North Carolina at Chapel Hill students in a classroom discussion. Photo courtesy of Viji Sathy.

# Closing the Achievement Gap Requires Asking, Not Telling

By Rebecca Prinster

## What if all it takes to close the achievement gap for African American and first-generation college students is to restructure the classroom to give students a more active role in learning? The authors of a study published in September suggest the solution could be that simple.

While the idea of the “flipped” classroom, in which less time is devoted to lecturing and more to an interactive approach, is not new, for the first time, a study that appeared in *CBE-Life Sciences Education* shows exactly who benefits the most. The report finds that in a moderately structured class, the achievement gap for African American students versus all students in the class closed by half, and in the case of first-generation students, the gap disappeared altogether. Additionally, all student populations in this more active-learning class saw improved scores.

Kelly Hogan of the University of North Carolina at Chapel Hill and co-author of the report, Sarah Eddy, a postdoctoral fellow at the University of Washington, examined six introductory biology classes at UNC, each with around 400 students. Three sections were taught in the traditional lecture format, in which students listened to the instructor lecture on the topic and then completed a final exam at the end of the semester.

The other sections required students to complete guided readings and weekly, graded homework online. Students used personal computers and devices to answer in-class questions, and Hogan taught all sections. In order to compare the six terms equitably for the study, student achievement was based on final exam scores and not graded homework assignments.

Hogan and Eddy labeled their study “second-generation education research”

because it reworked previous research published by Scott Freeman together with David Haak of the University of Washington, and Eddy. The goal of the UNC study was to examine why Freeman’s analysis of highly-structured courses showed success at reducing failure rates and how even a moderately structured course could be replicated at other institutions with different instructors and courses.

“A high structure course ... can be done through three additions to a typical lecture course,” says Eddy, “with a graded pre-class preparatory assignment ... preferably daily, graded student engagement with challenging problems or questions in class related to the reading, and graded review assignments spread throughout the term, preferably at least weekly.”

“[Hogan’s] classroom was an example of what we are calling moderate structure because she had homework ... but did not have review assignments,” Eddy says.

Unlike students at UW, UNC students in the study completed surveys, and the data was disaggregated to determine how distinct ethnic groups fared. Additionally, Hogan’s classes were composed mainly of freshmen of mixed majors, as opposed to the mostly sophomore-level chemistry students in Freeman’s study.

“The study at UNC was a replication of [Freeman’s] reformed course, but it went even further than his did,” says Eddy. “With [Hogan’s] students we

were able to ask survey questions and identify what behaviors and attitudes actually changed with the change in the course.”

Those survey questions asked how much time students prepared for the class, how a sense of community affected their likelihood of taking risks, and how valuable they found the class.

“We saw evidence in our survey that the increase in engagement in class and the higher frequency of assignments before class encouraged students to read assigned text more frequently before class and to spend more time each week studying for this course,” says Eddy. “In the non-reformed terms, students rarely read before class, and this is a common finding. It seems like students need some sort of accountability to take the time away from their obligations for other classes and personal obligations ... and make time for reading assignments.”

On the surveys, African American students more than others noted that the assigned homework helped in their comprehension of the material, and they perceived the class as requiring more “higher-order skills.” Hogan and Eddy also observed that African American students were more likely to speak up in the moderately structured class, enforcing the idea that an interdependent classroom culture fosters risk taking.

“Students in a traditional lecture course can come into a course, sit down, take notes and never ever talk to

another student or the professor for the entire term,” says Eddy. “In an active-learning course ... having students work in groups in class can help build a sense of interdependence in the classroom rather than the potentially isolating competitiveness of a traditional course.”

Hogan and Eddy noted that African American and first-generation students often arrive at college without crucial study skills. The more structured class trained students to spread out learning as opposed to cramming the night before. Having students complete assignments before class also freed classroom time for Hogan to work on higher-order skills development.

Additionally, the classes at UNC were more diverse than those in the previous studies; Hogan’s average student population was around 25 percent combined African American and Latino, while Freeman’s study was around 7 percent “underrepresented minority.”

“Most studies in STEM education



Kelly Hogan, PhD, director of instructional innovation for the College of Arts and Sciences and senior STEM lecturer at UNC. Photo courtesy of Viji Sathy.

“If you talk at students for more than 15 minutes, research shows they zone out. You have to engage them.”

- Kelly Hogan, Professor at University of North Carolina at Chapel Hill

report a single outcome for all students or at best report an outcome for majority students and an outcome for minority students,” says Eddy. “Lumping these students all together means we could be missing out on what is really going on in the classroom.”

Hogan first began implementing a more active approach to her lectures in 2010. “It was the result of a few things converging,” she says.

She knew from faculty development classes that more highly structured lectures in which an “ask, don’t tell”



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approach prevailed were more effective at helping students learn the material. Likewise, technology was changing around that time, making it easier to engage and coach students and give immediate feedback.

“One day a colleague of mine dropped a chart on my desk showing a variety of science classes at UNC, and mine was on there,” Hogan says. “It broke down the failure rate by race and ethnicity, specifically for black students. The disparity was so great for this demographic, that I knew I had to do something to level the playing field.”

Hogan thinks the success of structuring classes is not limited to STEM fields or highly selective institutions like UNC. She says the methods are not new and involve universal elements of teaching.

“This can work across all disciplines,” Hogan says. “So the key elements: number one is accountability. If a literature professor wants to talk about chapter three of a book and students haven’t read that far, they won’t be able to have a useful discussion in class. Number two is attention. If you talk at students for more than 15 minutes, research shows they zone out. You have to engage them.”

“Instructors need to realize that they can do this. They don’t have to be teaching a STEM course or have a lot of technology,” she says. “And they don’t have to make all these changes in one semester. They can do one thing at a time, like assign homework, or by doing 10-minute activities to break up the class.”

Eddy adds that providing students with guided reading questions is a simple and effective way to help novice learners evaluate what is important in the readings.

“I think the most important message is that a single instructor can make a difference for their students,” says Eddy. “A lot of teachers feel isolated and overwhelmed by the idea of tackling achievement gaps on their own, but this study gives them a starting point to begin this very important work of creating more equitable STEM classrooms.”

“And you’re going to have more fun,” says Hogan. “I don’t really enjoy being the center of attention or feeling like a story teller, so being able to walk around and talk to students and watch the class unfold in an unpredictable manner is rewarding and fun.”

Plans are already in place to test the transferability of the active classroom. Hogan will be working with the biology department at Wake Technical Community College in Raleigh, N.C. Eddy, Freeman, and Mary Pat Wenderoth, also of UW, are partnering with Everett Community College; Eastern Michigan University; California State University, Fullerton; Simon Fraser University; and the University of British Columbia to test the success rates of the structured class format at varying institutions. ●

Rebecca Prinster is a staff writer for *INSIGHT Into Diversity*.

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