Homework doesn't mean better grades, but maybe better standardized test scores, study finds

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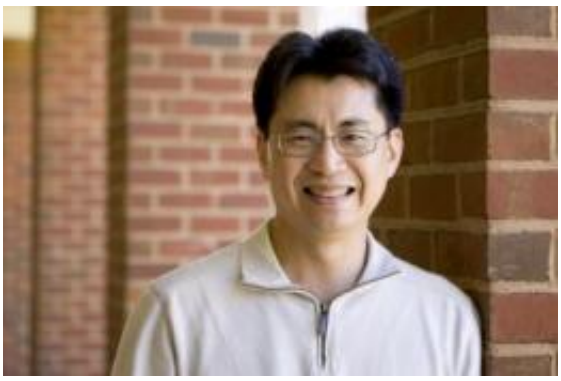

Robert H. Tai, associate professor of science education at U.Va.'s Curry School of Education Credit: Jane Haley

(Phys.org)—The time students spend on math and science homework doesn't necessarily mean better grades, but it could lead to better performance on standardized tests, a new study finds.

"When Is Homework Worth The Time?" was recently published by lead investigator Adam Maltese, assistant professor of science education at Indiana University, and co-authors Robert H. Tai, associate professor of science education at the University of Virginia's Curry School of Education, and Xitao Fan, dean of education at the University of Macau. Maltese is a Curry alumnus, and Fan is a former Curry faculty member.

The authors examined survey and transcript data of more than 18,000 10th-grade students to uncover explanations for academic performance. The data focused on individual classes, examining student outcomes through the transcripts from two nationwide samples collected in 1990 and 2002 by the National Center for Education Statistics.

Contrary to much published research, a regression analysis of time spent on homework and the final class grade found no substantive difference in grades between students who complete homework and those who do not. But the analysis found a positive association between student performance on standardized tests and the time they spent on homework.

"Our results hint that maybe homework is not being used as well as it could be," Maltese said.

Tai said that homework assignments cannot replace good teaching.

"I believe that this finding is the end result of a chain of unfortunate educational decisions, beginning with the content coverage requirements that push too much information into too little time to learn it in the classroom," Tai said. "The overflow typically results in more homework assignments. However, students spending more time on something that is not easy to understand or needs to be explained by a teacher does not help these students learn and, in fact, may confuse them.

"The results from this study imply that homework should be purposeful," he added, "and that the purpose must be understood by both the teacher and the students."

The authors suggest that factors such as class participation and attendance may mitigate the association of homework to stronger grade performance. They also indicate the types of homework assignments typically given may work better toward standardized test preparation

than for retaining knowledge of class material.

Maltese said the genesis for the study was a concern about whether a traditional and ubiquitous educational practice, such as homework, is associated with students achieving at a higher level in math and science. Many media reports about education compare U.S. students unfavorably to high-achieving math and science students from across the world. The 2007 documentary film "Two Million Minutes" compared two Indiana students to students in India and China, taking particular note of how much more time the Indian and Chinese students spent on studying or completing homework.

"We're not trying to say that all homework is bad," Maltese said. "It's expected that students are going to do homework. This is more of an argument that it should be quality over quantity. So in math, rather than doing the same types of problems over and over again, maybe it should involve having students analyze new types of problems or data. In science, maybe the students should write concept summaries instead of just reading a chapter and answering the questions at the end."

This issue is particularly relevant given that the time spent on homework reported by most students translates into the equivalent of 100 to 180 50-minute class periods of extra learning time each year.

The authors conclude that given current policy initiatives to improve science, technology, engineering and math, or STEM, education, more evaluation is needed about how to use homework time more effectively. They suggest more research be done on the form and function of homework assignments.

"In today's current educational environment, with all the activities taking up children's time both in school and out of school, the purpose of each homework assignment must be clear and targeted," Tai said. "With

homework, more is not better."

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