What Self-Regulation Means for Engineering Student Success | College of Engineering

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News Release — June 22, 2021 — College-level engineering and math courses are not for the weary. Of course, the subject matter itself is difficult, but students also need the mental and emotional skills it takes to solve complex problems. Helping students develop these mental and emotional skills, what researchers call self-regulation, could mean the difference between a student advancing in their engineering education or giving up on the dream entirely.

Associate professor Oenardi Lawanto and assistant professor Angela Minichiello received a large grant from the National Science Foundation to research and develop teaching methods that promote student self-regulation in math and engineering courses.

Engineering education faculty Oenardi Lawanto and Angela Minichiello have received a three-year $529,000 grant from the National Science Foundation to better understand how students self-regulate their thoughts and emotions while solving problems in second-year engineering and math courses. Their ultimate goal is to develop teaching methods instructors can use to promote self-regulation, thus helping students achieve greater academic success.

A student who self-regulates well, for example, will seek out study spots where they can concentrate, select study partners who help them stay focused, take breaks when they’re feeling overwhelmed, and double-check their answers before submitting a test. Such a student isn’t immune to failure; rather, they learn from it.

“If you fail something, it’s possibly because you’re not monitoring, you’re not learning from your mistakes,” said Lawanto. He’s been studying problem-solving among engineering students for more than a decade. “If you regulate well, you know what’s working and what’s not working based on your past experience. You’re monitoring your strengths, your weaknesses, what strategy you need to use to solve a problem, whether in academics or in life. So it’s essential.”

Self-regulation has been widely studied in K-12 students with disabilities, but it has recently garnered attention from researchers in other contexts. In addition to engineering education, it is also being studied in pilot and medical schools, where self-regulating can have life-or-death consequences. But it also an important study topic with the rise of online learning, where Angela Minichiello says the skill may be even more crucial for student success.

“Looking at a study we did on the rapid switch to online learning, one of the things we found was that students really struggled with motivation. If they can become motivational regulators or emotional regulators, that’s the kind of thing that is really important as we go further into online.”

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