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THE BRILLIANT BLOG

When, And How, To Let Learners Struggle

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"Let them eat cake," said Marie Antoinette. Should teachers, parents, and managers say of the learners in their charge, "Let them struggle"?

Allowing learners to struggle will actually help them learn better, according to research on "productive failure" conducted by Manu Kapur, a researcher at the Learning Sciences Lab at the National Institute of Education of Singapore. Kapur's investigations find that while the model adopted by many teachers and employers when introducing others to new knowledge—providing lots of structure and guidance early on, until the students or workers show that they can do it on their own—makes intuitive sense, it's not the best way to promote learning. Rather, it's better to let neophytes wrestle with the material on their own for a while, refraining from giving them any assistance at the start.

In a recent study published in the *Journal of the Learning Sciences*, Kapur and a co-author, Katerine Bielaczyc, applied the principle of productive failure to mathematical problem solving in three schools in Singapore. With one group of students, the teacher provided intensive "scaffolding"—instructional support—and feedback. With the teacher's help, these pupils were able to find the answers to their set of problems.

Meanwhile, a second group was directed to solve the same problems by collaborating with one another, absent any prompts from their instructor. These students weren't able to complete the problems correctly. But in the course of trying to do so, they generated a lot of ideas about the nature of the problems and about what potential solutions would look like. And when the two groups were tested on what they'd learned, the second group "significantly outperformed" the first.

The struggles of the second group have what Kapur calls a "hidden efficacy": they lead people to understand the deep structure of problems, not simply their correct solutions. When these

students encounter a new problem of the same type on a test, they're able to transfer the knowledge they've gathered more effectively than those who were the passive recipients of someone else's expertise.

In the real world, problems rarely come neatly packaged, so being able to discern their deep structure is key. But, Kapur notes, none of us like to fail, no matter how often Silicon Valley entrepreneurs praise the salutary effects of an idea that flops or a start-up that crashes and burns. So, he says, we need to "design for productive failure" by intentionally managing the *way* learners fail.

Kapur has identified three conditions that promote a beneficial struggle. First, choose problems to work on that "challenge but do not frustrate." Second, provide learners with opportunities to explain and elaborate on what they're doing. Third, give learners the chance to compare and contrast good and bad solutions to the problems.

By allowing learners to experience the discomfort of struggle first, and the triumph of understanding second, we can ensure that they have their cake and eat it, too.