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We scientists are so fascinated by the “how” that we treat formalism as a hallmark of science and let reductionism define our sense of beauty. But while the glorification of the “how” is arguably what makes us good scientists, it is the very trait that tends to make us bad teachers!

Having been lost helplessly in the land of the “what”, observing disparate phenomena and collecting seemingly random data, it is a joy to finally meet the “how”: a mechanism that “explains” and ties everything together. The “how” not only makes us “understand”, it also gives us the power to predict, a pinnacle for any scientist or engineer. As teachers, we are so eager to share the “how” with our students that we are willing to forgo the “what” and delve into formalism. When asked to teach students about cars, we find nothing interesting to say about driving or steering wheels, but rave about the torque equation of the axle. We think that by exposing the cause-effect façade, students will better understand the subject. For them, however, this bottom-up path is complex, too long, and “boring”.

What if our lectures focused only on the higher abstraction levels? And rather than teach mechanisms, what if we set up learning environments in which students can explore, make connections, and discover the “how”? Perhaps they would then learn to deal with the unknown, and dare to contemplate “what can be” rather than be locked in “what is”.

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