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## Why we fail to transfer

Let's go back a couple of centuries — imagine a carpenter training his son or daughter in the craft. Does he first make his child learn all the basic concepts of mathematics, because well, one needs arithmetic and geometry in carpentry? Does he also make his child learn the basic concepts in physics, because a knowledge of forces and equilibria is also critical for carpentry? How about throwing in some material science, communication skills, business management and creativity courses into the mix too? And only when his child has passed examinations to test this knowledge in contexts that have little to do with carpentry, involve him or her in the practice of the craft? Hopefully not. Instead, the carpenter is more likely to take his child to the shed, and set to work on various tasks. The child learns all there is to learn about mathematics, physics, and so on, in his practice of carpentry.

And yet, how do we teach in schools and universities now? We decouple knowledge of mathematics from the practice of mathematics, knowledge of engineering from the practice of engineering, knowledge of medicine from the practice of medicine, and so on. We do this because we assume that the basic knowledge of the discipline needs to be learned first before it can be applied in professional practice. This is a flawed assumption.

Take an engineering student, for example, who may have learned advanced differential calculus, yet finds it difficult to apply to solve engineering problems in practice. Or a medical student, who crams in a lot of knowledge about anatomy, yet finds it difficult to remember soon after the final exam, let alone use it for diagnosis during clinical practice. Or a science student, who learns the laws of motion, yet may be lost when asked to conduct scientific inquiry using that very knowledge.

In the learning sciences, we call this a problem of transfer. That is, although students learn substantial amounts of formal knowledge in their subject area, they find it difficult or are often unable to apply this knowledge in real-life situations. Why does this happen? Because we are teaching in ways that tend to be decontextualised and are misaligned with the practices where such knowledge will be used. And having ourselves created the problem, we then lament that our students find it difficult to transfer what they learn to the real world.



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