Deliberate Practice

As we saw in the module, there are many ways to do effective teaching-and-learning. We'll look at one end of one axis here.

One extreme of the spectrum -- which we took in 6.002x -- is project-based learning. Students do complex tasks and learn and practice many concepts at the same time with minimal scaffolding (http://en.wikipedia.org/wiki/Instructional_scaffolding). edX does this very well (at least relative to other technology platforms).

On the other end of the scale is deliberate practice. Students repeat a small, focused task many times until they master it. A good analogy is tennis. Project-based learning is like playing a tennis match. Deliberate practice is like hitting hundreds of backhands in a row. Both are important.

While traditionally associated with simple skills -- like practicing multiplication tables until error rates go down (http://en.wikipedia.org/wiki/Learning_curve) -- it is much more general. Ideally, you simply pick the parts of the course that students either struggle with the most, or where you need the highest level of mastery, isolate them, and practice them in isolation. Indeed, deliberate practice is sometimes most helpful for developing some of the most complex skills. In physics, for example, the key goal is to develop problem-solving strategies. Problem solving involves a lot of grunge work, such as algebra. An example of deliberate practice (attributed to David Pritchard) involves giving students large numbers of problems, and having them merely identify the strategy used to solve the problem. Students make a statement such as: "I would set up conservation of energy on the two balls, set up conservation of momentum, and equate the two," but do not actually solve the problem. This takes a fraction of the time, and as a result, students can learn the more complex skill much more often. Another example is a software design class at MIT where students write design documents for complex software systems, but do not actually implement them.

What are some ways technology could enable and enhance deliberate practice?