Mini-EdPsych Q & A - Dr. Susanne Lajoie

Expertise Development:

Masters of your own domain

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Please define the difference between expertise and talent?

As Ericsson, Prietula & Cokely (2007-in your references) state "Experts are not born they are made." Yes experts need a certain amount of "ability" in order to achieve but they are not defined by the amount of intelligence they have nor by the amount of physical "talent" that they possess. Remember that Tiger is good at Golf not Basketball. You are not born with a Golf gene. What many of us confuse for talent is raw determination, motivation and effort toward one's goals. In order to become an expert at anything you need to continually challenge yourself and keep practicing. Remember one must "deliberately practice" skills and get constructive feedback on those difficult skills so that you can improve. You must focus your mind and concentrate on this practice and focus requires motivation. You must want to succeed and set your goals accordingly. Krista Muis will discuss how motivation and goal setting go hand-in-hand.

How does the use of computers differ from traditional methods of learning? Which approach is more effective?

A computer is just a tool for instruction. Its how you design the computer based learning environment that makes it effective. Remember I spoke about my own work describing computers as cognitive tools. If you use learning theories to guide the design of your environment then you will have better outcomes with the computer environment. Remember that I linked the success of Sherlock and BioWorld to the fact that these environments provided condensed practice of real-world skills with appropriate forms of feedback. The most effective form of learning is one-to-one tutoring (Bloom, 1984). In fact one-on-one tutoring results in learning gains that are 2 standard deviations above the norm. Whereas human tutors are ideal computer tutors have the advantage of being provided to more learners in a more efficient manner. The advantage of computer tutors is that computers can observe the student learning through student actions and adapt the amount and type of assistance to the individual's needs based on a model of the learner and a model of scaffolding the learner based on dynamically assessing their performance on a task. Consequently computer tutors can have the same powerful effects of human tutoring. Effectiveness of the instruction, be it classroom, real world, with or without technology, is based on the theories of learning and teaching that guide the approach to instruction.

Bloom, B.S.: The 2_Sigma Problem: The search for methods of group instruction as effective as one-to-one tutoring. Educational Researcher 13 (1984) 3-15.

What is the cognitive apprenticeship approach?

Most of us have seen traditional apprenticeships. I gave the example of a hotel where novices learn to become a chef by observing their peers and being tutored by a Master Chef. Physical skills such as preparing a soufflé can be observed and then practiced, and the Master Chef can provide tutoring. Collins, Brown and Newman (1989) saw the value of apprenticeship and defined an original instructional model termed cognitive apprenticeship, where learners can apprentice to learn cognitive tasks like math or science by having experts model such skills. The problem is that cognitive skills are not readily observable. That is why we conduct the think-alouds as experts solve problems to prompt them about their thinking skills so we can understand their reasoning. By analyzing how experts think we can develop instruction and feedback that will help the novice acquire such skills in authentic learning contexts. The teacher can be viewed as a master, where students are apprentices. Consequently, the teacher decides what to model, how to scaffold or assist and when to fade assistance based on the individual learner. Computer coaches can assist students as well when they are designed with representations of what students should know and understand. These representations have been called student models. Student models can be updated based on student actions. Consequently, the computer can assess students dynamically and provide scaffolding or help based on an individual model of performance. Content knowledge can be modeled for learners by providing them with examples of strategies used by experts.

Collins, A., Brown, J. S. & Newman, S. E. (1989). Cognitive apprenticeship: Teaching the craft of reading, writing, and mathematics. In L. B. Resnick (Ed.), Knowing, learning, and instruction: Essays in honor of Robert Glaser. Hillsdale, NJ: Erlbaum.