

## WEEK 11

1. In this final week, we examine some aspects of the use of computers in the classroom – in particular, teaching both facts and the kinds of deep engagement required to learn Expert Thinking and Complex Communication.
2. The Lesgold piece is a particularly interesting discussion of one kind of computer application. Many kinds of teaching center on the following situation. When a student gives a wrong answer, it suggests that the student has an incorrect model in their head. The teacher's best strategy is to first understand what the student thinks is going on. The teacher can then use questions, counter examples, etc. to show the student where the mistake is and lead the student to the right model.

Cognitive tutor software is designed to mimic this process by inferring what the student must be thinking from the student's mistaken answer. This works well for simple domains but as Lesgold argues, in a complicated domain, the student can arrive at a particular wrong answer from many different directions so the cognitive tutor model breaks down.

Instead, Lesgold describes a learning-by-doing model where a student works through a particular sequence of problems – in this case, military technicians trouble shooting advanced electronic systems. The software records what the student has done and when the student calls for help, the software provides' an expert's judgment on where things stand: Based on what you have done so far, this is what I think we know and these are the things I would consider doing next.

3. Behind Lesgold's software is a theory about how people solve new problems. Rather than explicitly learn underlying principles, they learn the structures of large numbers of cases and use these cases to make analogies to new problems – i.e. Learning by doing. He says, for example, that people learn the game of football by playing and watching the game of football – not reading a football rules book.
4. The Dede paper presents a number of different kinds of classroom computer applications including applications fostering collaborative learning on specific kinds of simulations. At this point, however, it appears (to me) that computers are more able to assist in Expert Thinking than in helping students to learn Complex Communication which continues to require human interaction.