For example, Anderson (cited in Collins & Stevens, 1983) assisted learners in formulating models of what geographic factors affect average temperature by getting them to form and test hypotheses about the locations and temperatures of specific places. In addition, diSessa (1982), Champagne et al. (1982), and Lewis et al. (1993) have designed computer simulations that allow physics students to explore the implications of their own theories and compare these results to the predictions of other theories.

Finally, mental models may be explicitly taught to facilitate performance (Gagné & Glaser, 1987). These conceptual models provide an important supplement to teaching strategies. "We have found that students make up their own conceptualizations anyway, and if we don't give them guidance, their models can be bizarre and difficult to overcome" (Norman, 1982, p. 108). Choosing an appropriate conceptual model to use in instruction, however, can be a difficult task. In studies of how computer-ignorant students learned to use a text editor, Norman and his colleagues faced a choice between providing an incomplete model or spending a great deal of time conveying a complete model. They found their way out of this dilemma by providing different conceptual models at different points in the instruction, each designed to elucidate a different aspect of the editor (Norman, 1982).

For pedagogical or conceptual models to effectively facilitate learning, they should meet three basic criteria: learnability, functionality, and usability (Norman, 1983). A good model is easy to learn, most likely drawing upon information that is highly familiar to learners. A good model is functional, in that it corresponds to important aspects of the target system it is designed to model. For example, the components making up a system might be identified as well as how these components function together to enable the system to operate (Mayer & Gallini, 1990). A good pedagogical model may not necessarily be a complete model, in the sense of representing all important aspects of the target. If this is the case, then several models may be required to fully conceptualize the desired information, and learners should be told that each one is not a perfect representation of the system being learned (Jones, 1988). Finally, a good model is easily used, given the limitations of the human information-processing system. Again, this argues for a series of incomplete models over a complete one that taxes learners' processing capabilities.

Acquisition of a mental model might not be enough for true understanding, however. "To plan, predict, invent, or otherwise make good use of a mental representation, one must not just have it, but operate with and through it" (Perkins & Unger, 1999, p. 97). For instance, the students in Mr. Almaya's class in "A Lesson on Democracy" might learn to define and explain various functions of government as well as recognize and provide pertinent examples. But can they offer and defend an interpretation of a Supreme Court ruling or elaborate connections of the case to events in their own lives?