

stressed; students are learning what the different functions of government are and what differences there are among types of governments. By contrast, learning principles of cooking might involve theoretical understanding, for example, why beating eggs and oil together results in a creamy consistency. Elaboration theory provides specific guidelines for making instructional decisions about scope and sequence.

Conceptual and Pedagogical Models. According to schema theorists, the provision of conceptual and pedagogical models is a means of making instructional materials meaningful and helping learners access and refine relevant schemata and mental models.

As designers, it is our duty to develop systems and instructional materials that aid users to develop more coherent, useable mental models. As teachers, it is our duty to develop conceptual models that will aid the learner to develop adequate and appropriate mental models. (Norman, 1982, p. 14)

Conceptual models are any of the models invented by teachers, designers, scientists, or engineers to help make some target system understandable.

Before instruction even takes place, however, teachers and designers should identify the mental models that learners bring to the instructional situation (Glaser, 1984; Gagné & Glaser, 1987). Studies in physics, for example, have shown that many learners have naive theories of physical phenomena (e.g., Lewis, Stern, & Linn, 1993; Champagne, Klopfer, & Anderson, 1980; McCloskey, Caramazza, & Green, 1980). Such naive theories may contain

	Executive	Legislative	Judicial
Description of function			
United States			
Great Britain			

FIGURE 4.7 A Comparative Organizer, or Frame, for a Unit on Government