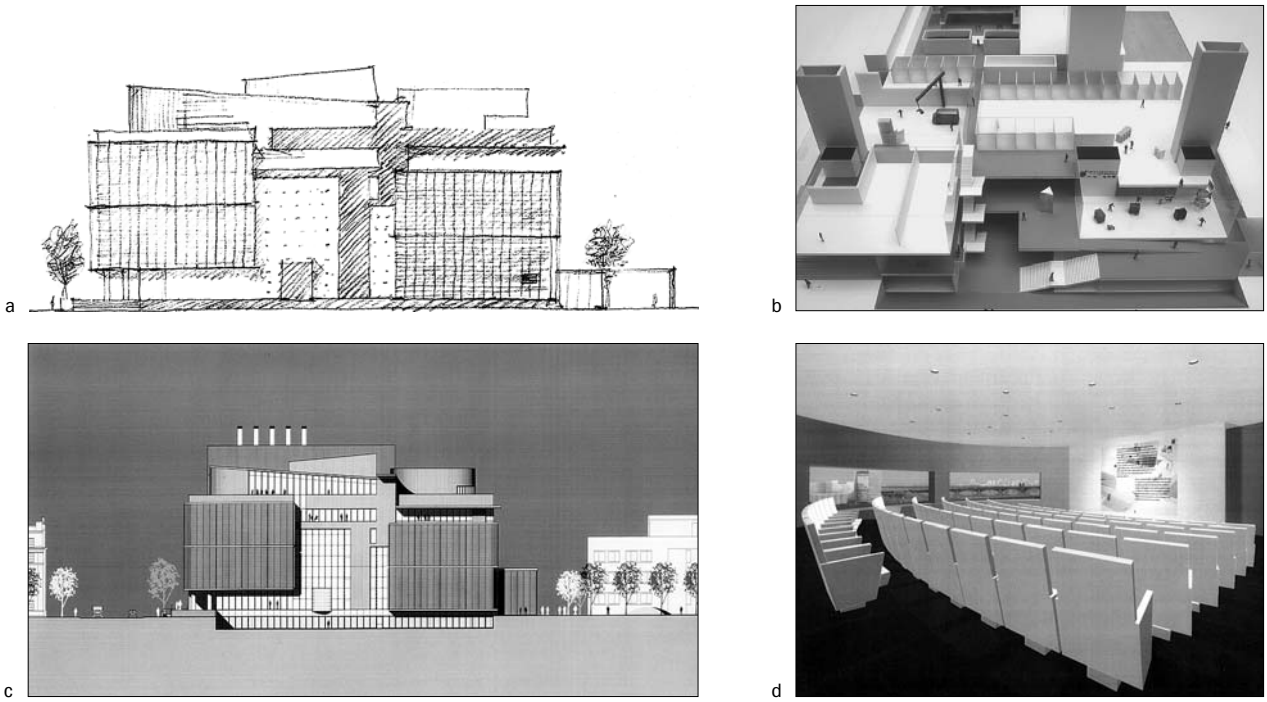

FIGURE 14-1
Different representations used at different stages, and for different purposes, in Fumihiko Maki's development of the design for a new Media Laboratory building at MIT.

a. Early sketch.
b. Physical model.
c. Developed technical drawing.
d. CAD perspective of an interior space.

TRANSLATING AMONG REPRESENTATIONS

Each of the three basic forms of representation has its particular technical advantages and disadvantages and associated costs. Each is well suited to particular stages and purposes within a design and construction process, and less well suited to use in other contexts. A typical design process, therefore, involves translation back and forth among two-dimensional drawings, three-dimensional scale models, and digital models. Sometimes these translation

steps are mechanical, but sometimes they are used as opportunities to make decisions and add information.

For example, two-dimensional drawings—particularly plans and sections—are cogent abstractions that represent fundamental properties of a design in a particularly powerful and useful way. However, they are not the most vivid and accessible way to describe qualities of three-dimensional space and light. And, when they are in paper format, they are difficult and expensive to modify and to keep consistent as modifications are made. (If you change the plan, you have to be sure to make the corresponding changes to the elevations and sections, and maybe plans on other floors.)

Three-dimensional models are typically more time-consuming and expensive to produce, but they provide a better way to understand the complexities of space and light. They are an excellent means of focusing a discussion, and (within limits) they support rapid exploration of options simply by moving pieces around.

Digital models are extremely versatile and flexible, they support automatic measurement, analysis, and simulation through application of software, and they can be transmitted rapidly and inexpensively through computer networks. However, they are not directly visible; they must be translated into other formats—displays, printouts, or physical models—before they can be inspected and discussed.

Translation paths among these three types of representations, and between representations and the three-dimensional reality of a constructed building, are shown in Figure 14-2. Some have long been familiar to designers; it is standard, for example, to translate sketches into working models during the exploration of design ideas, and equally common to move from models to drawings. The process of construction translates working drawings into full-scale physical reality, while the inverse process of measured drawing (often a crucial early step in interior renovation projects) produces drawings that correspond to the built reality. Historically, though less so today, it has also been common to construct directly from three-dimensional scale models, and to produce miniature model versions of existing buildings.

Some newer translation processes have also become familiar with the growing popularity of CAD. Printing and plotting processes translate digital models into two-dimensional drawings on paper, while digitizers and scanners