

that would activate existing subsumers. In the absence of analyses of the learners' cognitive structures and the concepts to be learned, Ausubel et al. (1978) argued, it is unlikely that an appropriate organizer could be constructed. Moreover, if criterion tests are either too easy or too hard, or if they are designed to measure verbatim recall, then no organizer effects should be expected.

A more serious criticism of advance organizers is that their definition is vague (Hartley & Davies, 1976). If researchers operationalize the concept of advance organizers in different ways, then it should come as no surprise that their results do not agree. Ausubel et al. (1978) countered this criticism by pointing to the volume of space in an earlier work (Ausubel, 1968) devoted to the "nature and definition of an organizer and how it affects information processing" (p. 175).

Focusing on the conditions under which advance organizers might be expected to facilitate learning, Mayer (1979) reported the results of a set of experiments he conducted to test the claims and criticisms regarding advance organizers. From his results, Mayer suggested that advance organizers should exhibit the following characteristics:

1. Have a short set of verbal or visual information,
2. Be presented prior to learning of a larger body of to-be-learned information,
3. Contain no specific content from the to-be-learned information,
4. Provide a means of generating the logical relationships among the elements in the to-be-learned information, and
5. Influence the learner's encoding process. The manner in which an organizer influences encoding may serve either of two functions: to provide a new general organization as an assimilative context that would not have normally been present or to activate a general organization from the learner's existing knowledge that would not have normally been used to assimilate the new material. (Mayer, 1979, p. 382)

Mayer (1979) went on to suggest that further research is required to determine what analogies, images, and examples in various subject matters may best serve as effective advance organizers. In order for advance organizers to work with particular students as well, they should probably be constructed by the teacher or instructional designer who has specific knowledge about what the learners already know. Mayer concluded with the following checklist for producing organizers to be used in research, suggesting that organizers that generate a yes for each question should be explored further:

1. Does the organizer allow one to generate all or some of the logical relationships in the to-be-learned material?