More and more universities are turning to Web-based instruction in order to accommodate a larger student population. Much of the coursework available online follows the traditional packet type system that has been available for printed correspondence courses. The major difference has been synchronous and asynchronous communication, not just between the instructor and students but among the students. However, learning can be enhanced if attention is given to how the material to be learned is presented and how students are required to interact with and interpret the material. Learning theories can be used to provide sound guidelines for designing a variety of presentation modes and student activities online. Examples provided later in this chapter come from an on-line course in Learning Theories at North Carolina A & T State University which was designed and taught by Karen Smith-Gratto.

A primary theory to consider is Gestalt theory because the main focus of Gestalt theorists was to explore perception and its relationship to learning. Smith-Gratto and Fisher (1998-99) stated “The screens rely heavily on the ‘visual perception’ of the learner” (p. 3). Consequently, the Laws of Perception should be the foundation for visually designing and evaluating the Web-based instructional page. Some of the Laws of Perception that would be beneficial in designing Web-based instructional pages are figure-ground contrast, simplicity, proximity, similarity, symmetry, and closure. In addition to the Laws of Perception, Gestalt theory can also provide guidance in the development of activities for students to engage in during the Web-based learning experience. While modern cognitive theory is in some respects an outgrowth of Gestalt theory, there are differences that can be exploited to provide additional approaches to Web-based instruction.

There are several approaches from cognitive theory that can be used to help design what appears on the Web-based instructional page and help design student interactions. Cognitive mapping or webbing, concept attainment activities, and use of motivational
graphics, animations and sounds are ways that cognitive theory can substantially contribute to the instruction.

In addition to Gestalt and cognitive theory, constructivism can be drawn upon to create Web-based instructional activities that require students to approach learning in different ways. Guidelines for developing Constructivist based activities require that students be given active and engaging tasks that require more than minimal intellectual involvement. Examples of such tasks include student development of models and metaphors to explain what they are learning. Students can be provided with demonstration simulations that are not explained. Students are then required to explain what happened within the demonstration and construct definitions and explanations based upon what they observed. In addition to these types of activities, students can be required to participate in on-line problem solving activities both alone and with other students.

**GESTALT THEORY**

In applying the theory of perception to screen design, figure-ground relationship must be considered.

Figure-ground contrast deals with the concept that the foreground of a visual needs to be distinct from the background. This is often violated on screens seen on the Web. Backgrounds often contain patterns or color, which cause the text to fade into the background making the text difficult to read. This aspect of Gestalt theory tells us that the text or graphics should have sufficient differences to make the separation of the information to be learned easily accessed by the learner.

Kohler (1947) and Koffka (1935) theorized that individuals unconsciously try to simplify what they perceive based upon expectations that are formed because of previous experiences. When a complex visual is used, the viewers will simplify the visual into a form that they can understand (Smith-Gratto & Fisher, 1998-99). Since viewers do this it would be more efficient to simplify the graphic when it is introduced then gradually add the complexity so that the learner may build up to the complexity required. The path from simple to complex can help prevent learners from misinterpreting the visuals provided. The principle of simplicity indicates that when visuals are used in Web-based instruction, the visuals should avoid the inclusion of distracting visual content. The visual should be unambiguous and easily interpreted by the learner; otherwise the content will be more difficult for the learner to understand.

Proximity is another aspect of Gestalt theory that can help with the design of Web-based instruction. It is easier for learners to understand that different text or graphic elements go together if these elements are placed close together. Text used to explain a graphic or as a label for parts of a graphic should be close by the graphic or part of the graphic to which the text refers. There should be no ambiguity or learners may perceive the text as referring to something other than what was intended.

The Law of Similarity states that people will group things together that have a similar appearance. Since this is the case, learners need to be aided in the recall of information by focusing their attention to the key concepts in a visual field (Kohler, 1947). This can be done in Web-based instruction by highlighting, animation, use of contrasting colors, or other techniques for calling attention to an item within the visual display. If the elements in a graphic are all the same style, the graphic will be seen as a whole. In order to call learners’
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