Chapter 4
Types of Graphics in E-Learning

ABSTRACT

Digital graphics commonly used in e-learning come in various image types and dimensions, each of which enables different types of information communications. The concept of dimensionality builds on how images work on the x, y, and z axes. This also builds on the affordances of digital imagery with live updates, movements, interactivity, emotionality, and other features that may be overlaid or imbued into visuals. This chapter addresses still images to dynamic ones. Considering the types of graphics and the informational value of each category should enhance their development and use in e-learning.

CHAPTER OBJECTIVES

• Introduce dimensionality in digital graphics
• Discuss the uses of 1D lines or vectors
• Examine the uses of 2D shapes and texts (including icons, diagrams, glyphs, graphemes, drawings or illustrations, image maps, photographs, and visualizations
• Describe 2D graphics that simulate three dimensions
• Analyze three dimensional graphics (including bas relief, photogravure, digital rubbings or frottage)
• Introduce 3 ½ D graphics that simulate or imply movement
• Highlight 4D or moving or animated graphics (including sprites, modeling for film or game work, and flowfields)
• Explore 5D graphics with psychological or emotional content (including avatar depth, emotional flocking, emo contents and characters)

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INTRODUCTION

Graphics have long played an important role in higher education and workplace-based trainings. The use of digital graphics have extended the value of one, two and three-dimensional visuals to the fourth dimension and beyond. Combined with high tech data captures, databases, and multimedia design, digital graphics enable interactivity and real-time live updating. These graphics may be more full-sensory and immersive. They may be real-time expressive. Many of the effects now pseudo-possible in non-digital (often illusion-based) form are enhanced, magnified and amplified with digital and computer-mediated means at higher visual quality. Digital images are usually Web-deliverable through desk-top computers, with some requiring more computing power.

Such digital graphics may be stand-alone, self-explanatory, and usable as an individual learning object, with informational value. They may be integrated into a larger context for sense-making and exploration. Digital images may be stand-alone visuals, or they may be integrated with other multimedia and text. They may be illustrations in e-books; live video captures, or slides in a simulated laboratory; digital avatars in an immersive space. Various image types offer different affordances. They help clarify complex information and relationships: “Users cannot understand the raw data, which is normally plain text specifying the position of each atom or the height of each location. Visualizing such data in a 3D environment allows us to understand how the data should be interpreted” (Itoh & Tanaka, 2006, n.p.).

Digital imagery, even simple line drawings, involves complexity. There may be a sense of focus by how objects are ordered in the foreground or background. There may be perceptions of depth. Various real-world images may be overlaid with synthetic overlays and artificial effects, or images may be mixed (aerial photographs and maps) for deeper informational value.

At the most basic level, these consist of bits and bytes. Digital images echo the world of matter in that small bits make up an illusion of wholeness (Negroponte, 1995). N. Negroponte of MIT’s Media Lab writes:

*A bit has no color, size or weight, and it can travel at the speed of light. It is the smallest atomic element in the DNA of information. It is a state of being: on or off, true or false, up or down, in or out, black or white. For practical purposes we consider a bit to be a 1 or a 0. The meaning of the 1 or the 0 is a separate matter. In the early days of computing, a string of bits most commonly represented numerical information* (1995, p. 14).

One way of thinking of digital visual contents borrows from Clark’s five-types of contents model (2007): fact, concept, process, procedure, and principle. Facts are discrete pieces of information. Concepts involve “groups of objects, events, or symbols designated by a single name.” Processes point to how something works. Procedures are series of steps resulting in the completion of particular tasks. Principles
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