

**Multimedia** Multimedia combines sound, graphics, video, text, and animation to present interactive stories, games, and educational materials. Electronic storage—whether on CD-ROM discs or on the Internet—allows symphonies, films, and even whole museums to exist online with instant access to background, history, and relevant commentary. Hypertext (nonlinear linkage) encourages browsing through encyclopedic knowledge bases. The interactive nature of multimedia requires a high degree of user participation, making it a powerful tool for training and education, as well as for new forms of communication. Designing multimedia requires collaborative work among artists and software developers. Because of its interactivity and nonclosure, multimedia challenges the aesthetics of telic, author-centered artworks. At the same time, the digital basis of multimedia raises concerns about its applications in legal proceedings, and its psychological power raises concerns about its impact on young people who play interactive games or browse the World Wide Web on the Internet. The shift of sensibility from contemplative to interactive modes suggests a cultural change that reaches far beyond the usual domain of the fine arts.

#### Definition in Historical Context

Interactivity is a key feature of digital multimedia. But long before multimedia, artwork in the twentieth century showed an interactive side. As early as the 1950s, some television programs experimented with interactive media. One CBS show in the 1950s, *Winky Dink and You*, instructed children to cover the TV screen with a thin sheet of plastic so they could draw with color crayons on televised images. In the 1960s, the term *multimedia*, along with cognates like intermedia or mixed media, characterized the work of art groups like USCO in Garnersville, New York, who combined films, tapes, and slides in their audiovisual performances. The mixed media of the 1960s flooded the senses with electronic multiscreen audiovisual “worlds” and strobe-light environments. Mixed-media artists drew upon what they took to be Marshall McLuhan's ideas about the sophisticated tribalism created by electronic worlds. In the 1970s, artists introduced “happenings” or elements of spontaneous audience participation, much as John Cage had done in music performance, and much like the action painters of the 1950s who emphasized dynamic process. Some of these media happenings later fed into the artificial realities explored by pioneers of virtual reality like Myron Krueger. By the 1980s, the personal computer enabled artists to combine several media on the same digital platform. Instead of patching single films, slides, or recordings, the artist could integrate vast amounts of audio and video stored on computers, including whole movies, libraries of text, and historical video clips, as well as recordings that span music history. In the 1980s, researchers at Apple Computer began using the term *media integration* to describe the use of digital sound, graphics, and text on a single desktop. Eventually, *multimedia* became an umbrella term for applying computer power to integrate a wide range of material for interactive use. By the 1990s, multimedia had spread to game arcades, compact-disc educational programs, museum tours, real estate guides. The multimedia made available by the browser software on the World Wide Web made the Internet computer network a commercial gold rush in the mid-1990s. The David Sarnoff Research Laboratory, among others, has been developing interactive television that combines interactive multimedia with traditional television.

The essential tool for navigating multimedia is hypertext. Hypertext represents an important concept for designing information, but the aesthetic implementations of hypertext vary considerably. Originally conceived by Vannevar Bush in 1945, then detailed by Theodor Nelson in the 1960s, hypertext makes it possible to choose among alternate pathways in a data landscape. The user can choose whatever seems at the moment to be the relevant pathway. The term *hypertext* (coined by Nelson) originally referred to an information aesthetics for written literature, but soon it came to characterize a broader navigation tool for

multimedia, sometimes called hypermedia. The same cognitive aesthetics for data-linked literature could be applied to any digitized sensory material. Hypermedia provides the user with software links that cross-reference a body of digitized data. The user can then choose to explore layers of meaning at any particular juncture. A backtracking or history function enables the user to review or revisit a previous series of choices. While the artist provides the initial set of links, the user has the option of activating the links in any order at will. In this way, the sequential structure of linear media—traditional books, films, music—becomes a subset of hypermedia. Hypermedia offers aesthetic freedom in controlling the art experience and calls for a new relationship between the artist, the artwork, and the art audience.

### Relation to Tradition

Multimedia undercuts the traditional relationship between the art object and the art audience. Traditionally, the audience receives the artwork as an object to contemplate or as information to consume passively. Interactive multimedia undermines this unilateral notion of media. The user's own choices become an intrinsic part of the multimedia experience. Likewise, with the artist's autonomy. While the artist must still shape the material or software for contemplation, the multimedia designer must at every step take into account the user's involvement. The unilateral artistic decision changes into an ongoing consultation with users. Instead of buyers or viewers, the art audience becomes participants. Because of its interactive nature, multimedia falls under the ecological, holistic paradigm, undercutting both the isolated software designer and the unilateral communications media. In this way, technology combines with art to achieve a synthesis similar to the ancient Greek *techē*: not a one-way technology for manipulating attention but an art shaped by usage. What also distinguishes hypermedia with its mixture of sound, graphics, video, and animation is the user's access to nonlinear background material. A score, for example, can include a video clip of a film while at the same time it can offer additional materials not included in the author's print of the film. Extra material, such as outtakes and documentation, can illuminate the initial conception. Related artworks can exist in juxtaposition to reveal the substructure on which the work stands. The hypertextual selection of relevant content makes it possible to navigate documentary material that would otherwise be daunting in its bulk. A listener might want, for example, to hear to the fifteen hours of Richard Wagner's Ring opera, isolate individual leitmotifs linked to their musical occurrences, look at the vocal score, read commentaries synchronized to the music, and see full-color images from historical performances—all of which is possible today on a single CD-ROM. With hypermedia, the user can choose to explore different sensory modes at the click of a button in a convenient format that offers instant searches. The multimedia artist can create linked materials that make it possible to know an artwork from many angles. What, therefore, distinguishes multimedia is not the combination of sensory materials but rather the underlying digital structure and the high-speed hypertextual access.

### Special Problems

Like real-time experience, multimedia authoring permits the serendipity of choices and the branches of multiple associations—something excluded by the closed form of traditional art objects. Since the ancient Greeks, Western art sought to satisfy the viewer by presenting a well-made object, something finished and complete. Art promised polished structures, whether through symmetrical patterns or through reversal and recapitulation. Drama, according to Aristotle, imitates a completed action, and Thomas Aquinas saw in *integritas* the hallmark of beauty. Only later, with Immanuel Kant and the Romantics, did open-ended infinity—under the guise of the “sublime”—enter into the art experience. Multimedia brings out the indeterminacy of meaning and what John Cage promoted as the tyche, oleatory aspects of experience.

Chance and change can translate into the cognitive disorder and information overload. So, to achieve aesthetic unity, multimedia may draw on atmospherics (opera's *tinta*), on Wagner's leitmotifs, or on menu-like overviews that provide a bridge between the interpreter and the indefinite, multifaceted art object. Future multimedia may evolve its own special integrity, when the artwork appears in the stored collaboration that has evolved from both the participants' response to the art object and the author's postulates. As in chaos theory, the artist's starting point functions less like a final cause and more like an initial starting condition. The artist's design "causes" the evolving product in an important but not in a final or deterministic sense.

A shift to interactive multimedia throughout a society implies a broader shift in how human intelligence functions. The shift brings with it changes in education and in how knowledge gets shaped. Since Plato, the model of human intellect has revolved around contemplative wholeness, the ability to sustain a fixed mental vision. The epistemic function was largely identified with the ability to integrate experience into a single, differentiated whole (Plato's idea or *eidos*). Multimedia manifests the movement of modern and postmodern culture away from the contemplative spectator who can grasp wholes. Knowledge in the interactive mode works as a collage of images, sounds, photos, and bits of information. The fragmentation faced by multimedia has precedents in early and late modern art. One example comes from music composition. Music composers, at least since Richard Wagner, confront the question of wholeness and closure. For centuries, the harmonic scale supported the melodic line of Western music so that a melodic series conveys an internal feeling of completion as its last note sounds, usually a tonic note of the established key or a note harmonically close to the tonic. Classical stylists like Wolfgang Amadeus Mozart or Ludwig van Beethoven play with the ear's anticipation of harmonic closure, injecting wit, elegance, and varying moods that exploit the listener's harmonic expectations. Wagner's operas pushed this musical legacy to the edge. Instead of closed pieces connected by spoken recitative passages, Wagner presented hours of a seamless, uninterrupted unity, an "endless melody." The *unendliche Melodie* preserves buoyancy and flow by continuously raising and shifting the ear's expectations so that the harmonic line seems to hover without settling or closing. Wagner used harmonic tonality against itself to the point at which the ear detects forward momentum but, just before arriving at the final tonic, the tonal line subtly slides into another harmonic scale. The effect is one of continuously ambiguous tonality in an endless musical process. Wagner's Ring cycle weaves together fifteen hours of music with recurrent motifs and dramatic sound textures. Inheritors of Wagner's style, such as Richard Strauss, turned symphonic music into tone poems held loosely together by floating harmonies, instrumental color, and recurrent figures.

Twentieth-century music continued Wagner's quest for greater melodic freedom and nonclosure. Arnold Schoenberg and the second Viennese school abandoned tonal closure in principle. Schoenberg advanced the flow of free sequences, of the unending series. The hostile public reaction to the Schoenberg school can serve as a warning to multimedia authors who face analogous problems of compositional unity. The pleasure of recognizing an entire pattern may belong intrinsically to the contemplative, compositional act of mind. If multimedia manifests a deeper shift of cultural energies away from the contemplative habit, then perhaps the artist need not face the opposition that greeted modern atonal music. Nevertheless, multimedia fosters a scanning/sampling cognitive mode that is sure to cause discomfort for traditional epistemic temperaments. When viewed online, multimedia often functions under metaphors of place, space, and architecture rather than under the more liquid metaphors of music. Multimedia then shades into cyberspace. The issue of contemplative attention appears as the search for habitable places and for Internet "home pages." Artists and

critics vacillate between the dynamic power of moving images and more stable depth rendered by immersive images and alphabetic text.

One further issue for multimedia artists is how to preserve the credibility and authenticity of content. Already, lawyers and judges use multimedia to present evidence in court. Previously, photographs and videotape served to establish evidence in courts of law. Now, with the application of multimedia to organize legal materials, special standards of authentication seem necessary. Digital information is inherently manipulable. Digital photos, video, text, and music do not inherently preserve real-world references; they can easily be altered. Digital signals consist of numbers on a computer, and any number can be altered without a trace of its having been so. Film studios currently digitize analog films and in seconds can convert night scenes to day scenes, and vice versa. The security and authenticity of data remain troubling issues.

See also [Artificial Intelligence and Aesthetics](#); [Computer Art](#); [Cyberspace](#); [Digital Media](#); [Hypertext](#); [Medium](#); and [Virtual Reality](#).

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