Interactive Media

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Interactive Media

The term *interactive media* defines a vast array of digital and computer-mediated systems, products, and services that rely on the users' input to generate output. As such, interactive media are distinguished from traditional or linear media insofar as their design and development explicitly relies on user participation. Participants' engagement is, thus, both a seminal principle and an intended system consequence (e.g., first-person video games). This entry provides an overview of interactive media and then explores its language, genre, and forms as well as directions for future research.

Overview

Interactive media design often relies on determined levels of user input, such as prespecified hot spots (e.g., buttons) and/or triggers (e.g., actions), defined by the authors. Those can range from highly programmed paths (user is given a specific order and/or number of options) to exploratory wandering (user is given full freedom on how to explore the system and/or narrative world). By definition, interactive media comprises fiction and nonfiction, including essentially all multimedia formats—text, audio, image, video, animation—in 2-D and 3-D spaces. Interactive media also span online and off-line worlds, virtual and hybrid environments, genres and formats, as well as academic disciplines and professional occupations (e.g., video games, interactive documentary, educational DVDs, augmented reality apps).

The Language of Interactive Media

As an umbrella term, *interactivity* can be tracked back to the notion of virtual reality in literature and even to the experimental narrative machines developed since the 1950s (e.g., the Sensorama, by Morton Heilig, and the idea of a multisensory machine), in the 1960s (e.g., the Headsight, by Charles Comeau and James Bryan, as the precursor of head-mounted displays), and throughout the 1970s (e.g., Pong, as the demonstration of economic viability for the video game industry). In the 1980s, there was the EyePhone, by Jaron Lanier, with its ability to control virtual objects, and the 1990s brought the world Nintendo's Virtual Boy—and the first effort to disseminate access to virtual reality.

In its contemporary conception, interactive media situates computer-mediated communication and human–computer interaction, necessarily implying the pivotal notion of cybernetics, as the study of information exchange and feedback between human and computational systems (e.g., Norbert Wiener). As such, interactive mediation is highly context-dependent, involving the articulation of hardware, interface(s), and software, so that an input signal generated by the *interactor*—for example, a computer mouse click or a gesture—is able to produce an output signal from a *receptive system*—namely, the software window that opens. Therefore, interactive media are distinguished from simple multimedia in the sense that participant engagement goes beyond the mere passive contact with multiple media formats.

Due to the transdisciplinary nature of interactive media research and the intersection of several disciplines in its practice—including, but not limited to literary studies, philosophy, anthropology, sociology, communication and journalism, information, and computer sciences—as well as due to the increasing diversity of its artifacts and applications, the meaning of *interactivity* is often revisited and contested. Although, as a minimum common ground, it is possible to root the basics of *interactivity* as (a) the inherent properties of a system and as (b) the interactors' responses to that system design, its media affordances, and narrative structures. This broad definition allows for the consideration of different levels and modes of interactivity, which can be defined by human-centered system design, that is, the standards and frameworks that serve as the basis for systems' development have at their core a human perspective.

Theoretical work toward a language of new media goes beyond the information system properties and ad-

dresses also *why* and *how* the emergent computational representational attributes constitute a distinct media—complete with materials, logic, operations, and forms—often making the use of terms such as *digital* and *interactive* problematic. These scholars, including Lev Manovich, propose that numerical representation changes the *nature* of the media. As a result, volatile signs (i.e., zeroes and ones), according to Marie-Laure Ryan, become the raw material for intrinsically procedural environments (i.e., computational environments). Further, according to Janet Murray, in these environments, the computer is fundamentally an engine.

In his influential 2001 book *The Language of New Media*, Manovich presents five principles of new media that have become a canonical groundwork for thinking about, producing, and evaluating interactive media. These are:

- (1) *Numerical representation*: Digital artifacts are composed of binary code (computer data). They can be described through a mathematical function and, consequently, be transformed by algorithms;
- (2) *Modularity*: Digital objects have a modular structure and correspond to autonomous media containers;
- (3) *Automation*: Due to its numerical representation and modularity, digital media objects can be automated;
- (4) *Variability*: Also due to principles (1) and (2), through computational processing, digital artifacts are mutable; and
- (5) *Transcoding*: Computerization and programming allow for a database to be transcoded into a vast array of multimedia forms.

Interactive Media Genres and Forms

Interactive media genres and subgenres have rapidly evolved since the 1980s. Interactive narrative and transmedia storytelling—fiction and nonfiction—are two of its most active fields.

If the computer is the fundamental system component in any interactive media, video games are their notorious representatives. In the 1980s, arcade games, such as *Pac-Man* (1980) and *Donkey Kong* (1981), introduced key narrative elements into video game design. These were subsequently developed in *Super Mario Bros* (1985), *The Legend of Zelda* (1986), *Final Fantasy* (1987), and *Grand Theft Auto* (1997), *Call of Duty* (2003), *BioShock* (2007), and *Assassin's Creed* (2007). The creative course in the video game industry reflects the developments in terms of graphical user interfaces—both in desktop computers, consoles, and mobile devices, such as smartphones and tablets—as well as in cloud computing, particularly in the case of massively multiplayer online gaming

Overcoming the storage limitations of the 1980s laser disk (e.g., *Astron Belt*, *Dragon's Lair*), and the 1990s and early 2000s interactive CDs and DVDs, interactive fiction cinema is exploring new territory, particularly in terms of aesthetics and nonlinear narrative paths (e.g., *Heavy Rain, Detroit: Become Human*), distribution, and reception channels, the latter supported by in the cloud computing gaming systems (e.g., *STEAM*).

The field of nonfiction narrative has also evolved greatly throughout the 2000s. The National Film Board of Canada, the public Franco-German network Arte, and the Massachusetts Institute of Technology–Open Documentary Lab have been key institutions in terms of producing and studying the evolving intersection of interactive media and documentary. For example, *Bear 71* (2012) explored the connections between the human society and the world of grizzly bears in Canada*,* and *Gaza/Sderot* (2008) told stories from neighboring Palestinian and Israeli cities.

During the early 21st century, the connection between journalistic narrativity and digital media representation-

al technologies has also generated a renewed interest from scholars and practitioners, in the form of experimental settings created to drive innovation (i.e., news labs). These include The New York Times Research & Development Group, the BBC News Labs, and Google News Initiative, the last mainly through The Digital News Innovation Fund. New narrative subgenres have emerged (e.g., data journalism, news games, immersive/virtual reality journalism, augmented reality journalism), with news outlets and independent producers embracing an innovation imperative as a way to answer the audience decline faced by traditional mass media formats and vehicles.

Interactive multimedia learning environments have also been developed at schools and universities, following the premise that enhancing teachers' and students' agency and engagement has the potential to promote deeper teaching–learning experiences (e.g., Moodle learning management system, Scratch programming language, and online community). However, several assessments reveal that effective interactive multimedia learning requires further user-centered design, emphasizing the role of educational theories over technological determinism.

Research Directions

Human communication is naturally multimodal, integrating speech, gesture, and movement of the body. In the early 21st century, digital media establish renewed and emergent conditions, structures, and grammars for mediated expression and communication, including syntactic, aural, visual, kinetic, and haptic both in 2-D and in 3-D environments. The ecosystem of smart speakers, smart TVs, and their computational assistants (e.g., Alexa, Cortana, Google Assistant, Siri) offers a glimpse into the world of emerging technologies and the progressive invisibility of mediation, shaping everyday life experience through connected objects and the augmentation of perception, making multimodal communication and embodiment two key issues in the future of interactive mediation research.

See also Digital Television; Educational Technology; Hypertext and Hypermedia; Mobile Media; Multimedia; News Lab; User-Generated Content; Video Games

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- new media

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Further Readings

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