Introduction

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It has been my conviction that most members of the computer programming community are also game players. Computerized game playing may be found to some degree at almost every computer installation. This is primarily because most computer professionals agree that information gained while programming computers to play games is directly transferable to other areas of scientific and business programming.

Donald D. Spencer,
Preface to Game Playing With Computers (1968)

After forty years since it appeared, the video game has recently become the hottest and most volatile field of study within new media theory. At last the idea of video game theory is gaining acceptance in academia, even as pockets of resistance still remain. A few years ago this reader could not have come into being, not only for lack of an audience, but because of the scarcity of scholars willing to take the video game seriously as a cultural object worthy of attention.[1] In past years, video games, when they were mentioned at all, usually appeared only as one example among many of new media technologies (and often a marginal one at that). But as the medium continues to mature it has in many ways become a centerpoint among digital media and its importance is finally being recognized.[2]

The video game is now considered as everything from the ergodic (work) to the ludic (play); as narrative, simulation, performance, remediation, and art; a potential tool for education or an object of study for behavioral psychology; as a playground for social interaction; and, of course, as a toy and a medium of entertainment. Likewise, the emerging field of video game theory is itself a convergence of a wide variety of approaches including film and television theory, semiotics, performance theory, game studies, literary theory, computer science, theories of hypertext, cybertext, interactivity, identity, postmodernism, ludology, media theory, narratology, aesthetics and art theory, psychology, theories of simulacra, and others. The collection of essays in this anthology is testimony to this diversity, and underscores how the study of video games has become a nexus of contemporary theoretical thought.

And yet—the terrain is only beginning to be explored and mapped, the first walkthroughs are just being written. The medium itself is a moving target, changing and morphing even as we try to theorize and define it.[3] But its trajectory can be traced through the writings of the past three decades that set the groundwork for video game theory.

A Brief History of the Study of Video Games

A number of histories have already given accounts of what is commonly considered to be the first real video game (*Spacewar!* [1962]), the first commercial video game (*Computer Space* [1971]), the first home game system (The Magnavox Odyssey [1972]), and the first hit game (*PONG* [1972]), but little has been written about how the study of them arose. Although the term "video games" first appears as a subject heading in the March 1973–February 1974 *Reader's Guide to Periodicals*, articles on games appeared as early as 1970 under the headings "Electronic Games" and "Computer Graphics."[4] Even today, when games are written about they are variously referred to as "video games" (or even "videogames"), "computer games," or "electronic games." (Occasionally two terms appear together; for example, the "VCS" of the Atari VCS 2600 stood for "Video Computer System.") While the term "electronic games" is so broad as to include any games that have an electronic component (such as Milton Bradley's *Simon* [1978] or Parker Bros.'s *Merlin* [1978], neither of which has any visuals apart from blinking lights), the terms "video games" and "computer games" are more specific to the subject matter at hand; they are the terms most often used in popular and scholarly discourse. Because of its more exclusive and accurate nature, we have decided to use "video games" throughout this book.[5]

The earliest writings on video games were typically written by and directed at computer enthusiasts and hobbyists, with articles appearing in such venues as *Popular Mechanics*, *Popular Science*, *Popular Electronics*, and

Radio-Electronics, as well as general magazines such as *Newsweek* and *Time*. Many of these articles featured "how to" perspectives for building simple electronic games at home, such as electronic coin toss or tic-tac-toe programs, and there were even two books addressed to the computer programming community, Donald D. Spencer's *Game Playing With Computers* and A. G. Bell's *Games Playing With Computers* in Great Britain.[6] Like Spencer, Bell even makes a prediction as to the future of the video game medium:

> Apart from the educational aspects and training of programmers there are commercial benefits. Manufacturers have realised that they are more likely to improve their sales if their new machines can win at chess than if they can invert nonsensical matrices. The lay purchaser is more likely to prefer a chess program (which he believes he understands) as a measure of the power and speed of a machine. Indeed, as consoles become more and more common, then eventually computers will become as available as the television set. If so, it is very likely that future generations will use them in their leisure time to interact with game playing programs. The commercial profits of such entertainment could well exceed that of any "useful" activity.
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> Unfortunately, at the moment, most people who wish to play games with computers do not have the eminence of a Turing et al. Rather than convince the "reader," they have to convince the firm that such work is useful. A word of advice: do not say you wish to "play games." Much better is a wish to study "dynamic technique of search and evaluation in a multi-dimensional problem space incorporating information retrieval and realised in a Chomsky Type 2 language."[7]

As the latter half of the quote demonstrates, the attitude considering video games as useless toys was already present even while the video game was still in a purely experimental stage.

After the appearance of commercial video games in the arcade and the home, game reviews began appearing, as well as articles examining the market for video games. By the late 1970s, the majority of articles focused on commercial video games and all the new systems appearing, with fewer mentions of the amateur home-built variety. As the arcade game industry grew, several trade journals for coin-op arcade owners appeared: *Play Meter* in 1974, *RePlay* in 1975, and *Star Tech Journal* in 1979. Some of the first books on video games were published in the late 1970s; Creative Strategies' *Consumer Microelectronics: Electronic Video Games* (1976), Len Buckwalter's *Video Games* (1977), and Consumer Guide's *The Complete Book of Video Games* (1977). For the electronics hobbyist, there was Robert L. Goodman's *How to Repair Video Games* (1978), David L. Heiseman's *How to Design and Build Your Own Custom TV Games* (1978), Walter H. Buchsbaum and Robert Mauro's *Electronic Games: Design, Programming, and Troubleshooting*, and others.[8]

The late 1970s and the early 1980s saw a growing market for home computers, fueled by electronics enthusiasts as well as video game players interested in home game systems. Both audiences were met with a variety of publications. Between 1981 and 1983, game companies including Activision, Atari, Coleco, Imagic, Mattel, and Magnavox produced magazines in-house covering their own products, along with over a dozen other independent magazines covering the video game craze.[9] In 1982 alone, the peak year for video game publications, over forty books appeared, the vast majority of which were collector's guides and strategy guides, such as Craig Kubey's *The Winner's Book of Video Games,* Michael Blanchet's *How to Beat the Video Games,* or the 670-page *Ken Uston's Guide to Buying and Beating Home Video Games.* Video game history, however, did not fare nearly as well. The first history of the medium, George Sullivan's *Screen Play: The Story of Video Games* (1983) was a short ninety-three-page book published for a juvenile audience, and the first history of video games written for adults, Leonard Herman's *Phoenix: The Fall and Rise of Home Video Games* (1984) was initially self-published when no commercial publisher could be found.

Prior to 1982, the only theory to be found was in the practice of video game designers who innovated changes and developed the medium with each advance in game design they made. Programmers such as Warren Robinett, author of the groundbreaking game *Adventure* (1979)[10] for the Atari 2600, were self-conscious about their methods even if they only articulated them in programming code rather than in print. But in 1982 Chris Crawford wrote *The Art of Computer Game Design,* the first book devoted to theorizing about video games, which would later be published by McGraw-Hill/Osborne Media in 1984. Crawford's book asked what games were and why people played them, and proceeded to suggest design precepts, describing methods and techniques, all the while defending the video game as an art form; "The central premise of this book is that computer games constitute a new and as yet poorly developed art form that holds great promise for both designers and players."[11] The end of the book even looked ahead to the development of the medium:

> To conclude: I see a future in which computer games are a major recreational activity. I see a mass market of computer games not too different from what we now have, complete with blockbuster games, spin-off games, remake games, and tired complaints that computer games constitute a vast wasteland. . . . I also see a much more exciting literature of computer games, reaching into almost all spheres of human fantasy.[12]

Video games were also given serious consideration in Geoffrey R. Loftus and Elizabeth F. Loftus's *Mind at Play: The Psychology of Video Games* (1983), which looked at the psychological motivations of game players, how games relate to the cognitive system of the mind (attention, perception, short-term and long-term memory, and expectancy), motor performance, and problem-solving skills. The Loftus's book, along with Patricia Marks Greenfield's *Mind and Media: The Effects of Television, Computers and Video Games* (1984) began the tradition of the video game as object of psychological study and a tool to be used in laboratory experiments. This tradition still continues today, including work such as Anderson and Dill's 2000 study linking video games with aggressive thoughts and behaviors.[13]

After the video game industry crash of 1984, the video game industry rebounded with a new generation of technological advances, beginning with the release of the Nintendo Entertainment System (NES) in 1985. Elsewhere, interest in so-called interactive multimedia, such as the newly developed CD-ROM technology, was growing in academia, with video games receiving at least tangential mention as a form of "new media" (despite the fact that the medium was almost a quarter century old). Interest in the video game as a cultural artifact was also on the rise, resulting in *Hot Circuits: A Video Arcade,* a retrospective exhibition of video games presented by the American Museum of the Moving Image from June of 1989 to May of 1990. Museum director and founder Rochelle Slovin recalled how the exhibition was seen by some as questionable or even controversial:

> Reaction from peers and Trustees was, in the beginning, mixed. Within and without the Museum, the idea was met with raised eyebrows. Our institution, after all, was founded in 1981 as the first museum in the United States devoted to the art, history, technique, and technology of motion pictures and television.[14]

An essential part of the exhibition was an essay by Charles Bernstein, which also situated the video game as a cultural object worthy of attention, indirectly becoming a kind of apologetics for video game study.[15] Although such an apology might have been needed in 1989, the video game soon gained greater respectability and academic interest as its representational power and status as cultural object grew throughout the 1990s.

In 1991, Marsha Kinder's *Playing With Power: Movies, Television, and Video Games from Muppet Babies to Teenage Mutant Ninja Turtles* treated video games on a par with other media and looked at connections between them and transmedia franchise crossovers. Instead of being treated as a special case or a marginal form of "new media," the video game was regarded as a cultural object that fit into a larger social and economic context. Kinder's book demonstrated that it was no longer possible to talk about transmedia franchises without including video games. And some video games had even become the basis of franchises. Since the mid-1970s, stories and characters had typically originated in film and television and made their way into video

games, not the other way around. This began to change in the 1980s when *Pac-Man* became an animated TV series and the movie *The Last Starfighter* was based on an Atari game that was never finished or released due, in part, to the 1984 industry crash.[16] By 1993, *Super Mario Bros.* was adapted into a big-budget feature film, and soon after other Movies such as *Street Fighter* (1994), *Double Dragon* (1994), and *Mortal Kombat: The Movie* (1995) found their way to the silver screen. Video games were now a source of material for film and TV, and became important to any discussion of them.[17]

Another reason for growing interest in games was the introduction of CD-ROM-based games in 1992. The increased storage capacity allowed for more detailed graphics and even full-motion video clips to be used in home games,[18] and the representational power of the medium grew. Despite the popularity and success of the CD-ROM, it took a while before the technology itself became the subject of study. Throughout the late 1980s and the 1990s, articles and books on CD-ROM technology tended to focus either on "interactive multimedia" or on technical aspects of the medium rather than on its place in culture. It was not until 1999 that a book-length scholarly work appeared on the topic, the anthology *On a Silver Platter: CD-ROMs and the Promises of a New Technology.* According to the editor, Greg M. Smith, the book was "intended to announce a kind of "coming of age" of CD-ROMs as a commercially, socially, and aesthetically significant medium worthy of close critical attention by media scholars."[19] Moreover, Smith underlined an important fact: while studying new media texts and the contexts of their reception, academics have been neglecting the multimedia form that was between the avant garde (i.e., hypertexts for instance) and the online (i.e., chatrooms or MUDs), that is, video games. As Smith noted, "Michael Joyce's hypertext *Afternoon, a story* has received more scholarly attention than the blockbuster CD-ROM *Doom,* although only a fraction of new media users have heard of Joyce's innovative text."[20]

Doom was released[21] in 1993, the same year as another landmark game, *Myst*, the game perhaps most responsible for the popularity of the CD-ROM. Both games became instant classics. They would come to represent the ends of a spectrum of gaming experience: *Myst* was a slow, contemplative game set amidst lush, painterly graphics, while *Doom* was a fast-paced shoot-'em-up set in claustrophobic tunnels and hallways where monsters lurked around every corner. In either case, the CD-ROM allowed games to grow to hundreds of megabytes in size while making their production cheaper than cartridges. The increased size and complexity of the games and their diegetic worlds also meant that game criticism would become more of a challenge as its object of study enlarged. More time and more game skills would be needed to see enough of a game to write authoritatively on it, and to write something more in-depth than merely a game review.

Two other debuts made 1993 an important year for video game studies: the first school for video game programming, and the World Wide Web. With the spread of graphical browsers, the Web quickly became one of the best research tools for video game study, beginning with websites of collectors, hardcore gamers, reviewers and publishers, and expanding to journalistic, research, and academic sites. Game communities grew and produced large-scale repositories of game information compiled from hundreds of contributors. For example, "The Killer List of Videogames," at <www.klov.com>, is a searchable database of over four thousand arcade video games including technical information, screenshots, cabinet art, and even Rotatable models of game cabinets created with QuickTime VR. Another site, <www.gamedex.com>, features a database for home video games. At the same time, game collectors were able to enlarge their collections and share them on-line along with the fruits of their research (for example, David Winter's website <www.pong-story.com>, which is one of the best sources of information on *PONG* and its imitators). As anyone who has surfed the Internet knows, websites vary greatly in their quality, but many of the best video game sites are as rigorous as any academic paper due to the scrutiny of hundreds of gamers, the use of e-mail as a way of providing feedback, and the ease and speed of web page updating.

Around the same time home computers were getting graphical web browsers, the DigiPen Applied Computer Graphics School began offering a two-year curriculum in video game programming, the first of its kind. DigiPen had begun as a computer animation and simulation company in 1988, and began training employees, until a 1991 discussion with Nintendo of America initiated the idea for a school for video game programming. According to the DigiPen website:

> With advisory support from Nintendo of America, DigiPen's engineers developed a two-year program with a unique curriculum in video game programming. In 1993, DigiPen Applied Computer Graphics School opened in Vancouver, BC, Canada, offering programs in computer/video game programming as well as continuing the training in 3D Computer Animation. Prior to DigiPen's course offering in video game programming, this type of training was unheard of in North America. The inaugural class graduated in 1996, nineteen graduates gathered about thirty job offers from various game development companies, such as Nintendo, Iguana, Sierra Online, Konami, Electronic Arts, Bandai Entertainment, and Sony of America.
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> To fulfill the growing number of positions available in the digital entertainment industry, DigiPen decided to offer a unique degree program—a Baccalaureate of Science in Real-Time Interactive Simulation. As many of DigiPen's students came from the US, DigiPen decided to apply to the Washington State Higher Education Coordinating Board for the authorization to grant such a degree. The authorization was received in 1996. Digipen Institute of Technology

was opened in Redmond, WA in January 1998, offering both Baccalaureate and Associate degree programs in Real-Time Interactive Simulation. In September 1999, DigiPen added an Associate degree program in 3D Computer Animation to the programs available.[22]

Not only was the video game now considered a suitable object of study, it was declared an art in France. In their 1993 book *Qui a peur des jeux vidéo?*, Alain and Frédéric Le Diberder declared that, after the six classical arts and the three newer ones (cinema, the comic strip [*bande dessinée*] and television), video games were the tenth art, a provocative proclamation for the time echoed in the tone of the introduction. The Le Diberder brothers wrote about the epidemic of home game systems in the 1970s and all the myths about the danger of video games that followed in the 1980s.[23] It is interesting to note that the Le Diberders's book was revised and rereleased under a new title in 1998, with a revealing change of title; in a few years, the study of video games went from being presented as an object of anxiety, *Qui a peur des jeux vidéo?* [Who's Afraid of Video Games?], to being characterized as a distinct and worthwhile whole, *L'Univers des jeux vidéo* [The Universe of Video Games].[24]

For the Le Diberders, the video game industry was the new Hollywood. The relationship between video games and cinema has long been understood in France, and is even more remarkable today. Cradle of the French New Wave, the notion of *mise en scène*, and the "*politique des auteurs*," the famous and vastly influential journal *Cahiers du Cinéma* welcomed video games with open arms in mid-1990s. The journal's first leading article devoted to the video game medium was written by Alain Le Diberder in 1996 and designated video games a "new frontier of cinema."[25] This rank was later confirmed in a special issue of April 2000 about "The Frontiers of Cinema." Video games were examined along with digital cinema, cinema on the Internet, television, video clips, and experimental films. And in September 2002, *Cahiers du Cinéma* dedicated an entire special issue to video games. Revealing their bias in favor of narrative games with an affinity to cinema, they gave importance to the medium in an editorial addressed to both film and game buffs:

> Henceforth, the video game no longer needs to imitate the cinema to exist because it proposes hypotheses that cinema has never been able to formulate, as well as emotions of another nature. If video games have looked to the cinema in the past (their designers are also moviegoers), today they allow us to look at the cinema differently, to question it in its modes of functioning and its theoretical principles. Video games are not only a social phenomena, they are the essential crossroads of a redefinition of our relation to the narrative world in images, prolonging what Godard had formulated ("A film: between the active and the passive, between the actor and the spectator"), without knowing that the video game was going to seize this question, to reply to this demand, while leaving the cinema without reply.[26]

Just as the generation of young directors in the French New Wave had grown up with cinema and had an intimate knowledge of the medium, the children who grew up with video games in the 1970s started coming of age in the 1990s, bringing with them a relationship between the image and the viewer (player) very different than that of the generation before them. This generation entered graduate school during the 1990s, and is now moving into the ranks of university faculty, where their video game playing experiences are being articulated in theoretical terms.

On a wider scale, the 1990s also saw a growing nostalgia for the 1970s and early 1980s, and interest in classic video games that turned them into collectibles. Primitive and strangely archaic compared to their contemporary descendents, classic games were remediated through emulators and ported to newer systems on CD-ROM, and new versions of old games like *Pac-Man* and *Frogger* appeared with three-dimensional graphics. Websites for collectors listed old games and home systems, and groups such as the Video Arcade Preservation Society (VAPS) were born. In 1996, Keith Feinstein's traveling exhibition Videotopia (<www.videotopia.com>) began bringing dozens of classic arcade games to museum audiences, introducing classic games to a whole generation of players younger than the games.

In the last few years, a number of books have joined in looking back to the video game's first golden age, including a few with academic or journalistic leanings. Nostalgic about the old arcade era, J. C. Herz focused her attention specifically on video games in *Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts, and Rewired Our Minds* (1997). Unfolding the rise and evolution of video games, she suggested that they were perfect training for life in fin de siècle America. She also showed how the medium has shaped the minds of a whole generation, stating that if *Citizen Kane* had taken place in the twenty-first century, Kane would have sighed "Mario" instead of "Rosebud."

Another book appeared in 1997 that contained serious academic writing on video games. Espen Aarseth's *Cybertext: Perspectives on Ergodic Literature* looked at the much wider field of all texts that require nontrivial user input to function, of which video games are only a part. Aarseth's emphasis was on the cybernetic nature of the text (that is, the feedback loop between the user and the text), and he viewed the text as a network:

> The cybertext reader *is* a player, a gambler; the cybertext *is* a game-world or world-game; it *is* possible to explore, get lost, and discover secret paths in these texts, not metaphorically, but through the topological structures of the textual machinery. This is not a difference between games and literature but rather between games and narratives. To claim that there is no difference between games and narratives is to ignore essential qualities of both categories. And yet as this study tries to show, the difference is not clear-cut, and there is significant overlap between the two.[27]

Aarseth is also the founder of the Digital Arts and Culture series of conferences and the online journal *Game Studies* <www.gamestudies.org>.[28]

Another theoretical account came in 1998 from the debates about gender and games, *From Barbie to Mortal Kombat: Gender and Computer Games,* edited by Justine Cassell and Henry Jenkins. As they wrote: "Too often, the study of computer games has meant the study of *boys* playing computer games. In fact, too often the very design of computer games for children has meant computer games for boys" [the proof being, as Jenkins mentions in further reflections, Nintendo's *Game Boy*].[29] Cassell and Jenkins also discussed the "girls' game" movement which "document[ed] one moment in that process of translating feminist theory into practice." Cultural theorists, developmental psychologists, academic technologists, computer game industry representatives, and female game players studied the state of the market and the difference between the genders, and gave their thoughts as to whether it was necessary to design video games for girls or to have a broader view in order to create games for both girls and boys. And just as *From Barbie to Mortal Kombat: Gender and Computer Games* took an interest in entrepreneurial feminism, revealing the vision and goals of girl-specific companies, Brenda Laurel's *Utopian Entrepreneur* (2001) explored the demise of her company Purple Moon, which was dedicated to designing and producing software for girls, and the battles she faced while trying to keep her company true to its mission.[30]

Academia was not the only area where more serious study of video games was taking place. While most journalistic writing approached video games from a sociological and popular cultural perspective, Poole's *Trigger Happy: The Inner Life of Videogames* (2000) took a different one. For him, the inner life of video games was bound up with the inner life of the player whose response was *aesthetic.* Comparing them with other media, especially with cinema, Poole wished to present the *charm* of video games and their unique properties. With many references to games, he described the psychological and physical involvement of the player. He examined the ways worlds were built, stories were told, and Western or Japanese characters were turned into idols. But, even more important, Poole had some theoretical propensity. *Trigger Happy* was riddled with quick references to philosophers and numerous thinkers such as Adorno, Benjamin, Plato, Huizinga, Peirce, and Wittgenstein. Steven Poole arguably pushed the journalistic accounts of video games into a more theoretically oriented direction.

By the end of the twentieth century, the video game had gained recognition (if not respect) in academia and had acquired the status of nostalgia and a historical, cultural object. In 1997, *Film Quarterly* featured its first essay on video games and the Society of Cinema Studies (now the Society for Cinema and Media Studies) had its first paper on video games at its annual

conference, with its first entire panel on video games appearing in 2000. No longer just a tangent or offshoot of new media theory, serious academic writing on the video game was finally beginning to carve out its own niche in the theoretical landscape.

Video Game Theory Comes of Age

At the turn of the millennium, video game theory, as a field of study, included a handful of books, several academic programs,[31] the first online academic journal (*Game Studies*), and over half a dozen annual conferences. As interest grows and the amount of academic work on video games multiplies, different trends in research and theorizing are already evident, especially in North America and Europe. Just as early film theory had its bifurcations (for example, Eisensteinian montage vs. the Bazinian long take), video game theory is already diverging into a variety of approaches, including narratology, cognitive studies, theories of representation, and ludology (the study of play). Examples of all of these can be found in this volume.

Many writings on video games, especially earlier ones, attempt to connect video games to other media, seeing elements shared between them, and much of the marketing and cross-franchising of video games does this as well. And there are, of course, many formal properties, organizational strategies, and elements of other media that are found in some video games but which are not in any way essential to the medium. For example, conservation of screen direction, sound perspective (or even sound itself), and narrative are found in some video games but certainly not all of them.[32] At the same, however, the video game is unlike any media to come before it, being the first to combine real-time game play with a navigable, onscreen diegetic space; the first to feature avatars and player-controlled surrogates that could influence onscreen events; and the first to require hand-eye coordination skills (except for pinball, which was much more limited and not as complicated). Massively multiplayer online role-playing games (MMORPGs) are the first persistent (twenty-four hours a day, seven days a week) worlds, and the first instance of individualized mediated experiences within a mass audience (each player's experience is unique despite the large number of simultaneous participants). And, apart from computer programming out of which it grew, the video game was the first truly algorithmic medium.

Even as the video game is clearly a unique medium and worthy of attention and forms of theory that can address it specifically, narrative elements and conventions taken from other media are still present to a great degree in many games, and a spectrum of positions exist combining ideas and terminology from various movements, even as the terms and definitions are not always agreed upon (for example, a number of scholars

find the notion of "interactivity" problematic, suggesting that the term is misleading[33]).

Academic debates on the nature of video games have begun heating up, and one finds discussions of them at conferences devoted to the study of media, like the newly renamed Society of Cinema and Media Studies (formerly the Society for Cinema Studies), and at conferences aimed more specifically at digital media or concentrating solely on video games. Such conferences can be found throughout the world. The Digital Art and Culture conferences have had an international emphasis from the start, taking place in 1998 and 2000 at the University of Bergen (Norway), 1999 at Georgia Institute of Technology (Atlanta, Georgia, United States), 2001 at Brown University (Providence, Rhode Island, United States), and 2003 at RMIT University (Melbourne, Australia). The online journal *Game Studies* is likewise international in its makeup, with its eleven founding members coming from seven different countries, and the two Danish members, Jesper Juul and Lisbeth Klastrup, also organized the first academic conference on video games, *Computer Games and Digital Textualities,* held at the IT-University of Copenhagen in March 2001.[34]

Other conferences on video games have been appearing in recent years: the International Games Culture Conferences, the International Game Developers' Association (IGDA) Conferences, the Challenge of Computer Games Conference (Lodz, Poland, August 25–27, 2002), Conference on Computational Semiotics for Games and New Media (COSIGN) conferences, the Game On conferences, Computers and Games 2002 (Edmonton, Canada, July 25–27, 2002), and others. More books are appearing, in Europe as well as the United States. Regarding the state of books on video games in Germany, Konrad Lischka, author of *Spielplatz Computer,* writes:

> Within the last two years Germany has experienced a boom of literature on computer games—at least if you compare the amount of published books with what came before. Before the turn of the millennium, an interesting book about computer games appeared only once a decade. In the eighties it the was semiotically-inspired *Pac-Man & Co.* (1984) by the film critics Georg Seesslen and Christian Rost, and in the nineties there was the essay collection *Schöne Neue Welten? [Beautiful New Worlds?]* (1995) edited by Florian Rötzer. But since 2000 almost ten books of that kind appeared in Germany.
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> There are three reasons for this. At present, the generation that grew up in the eighties indulges itself in its collective memory. Books like *Generation Golf* or the revival of German Punk arose from this development. Old video and computer games are part of this nostalgia wave. The coffee table book *Electronic Plastic* provides the pictures (of old hand-held games and table-top games) and the book *Wir waren Space Invaders [We Were Space Invaders]* by Mathias Mertens and Tobias O. Meissner provides the text. They define the culture of their youth through games.

> The second reason for the high output of titles is the discussion about the effects of computer games. After the Columbine shootings of Littleton, Colorado, a tighter control of games by the authorities was discussed in Germany, and realized after the gun rampage of Erfurt. One book on this topic addressed to the broad public but remarkably differentiated is Hartmut Gieselmann's *Der Virtuelle Krieg [The Virtual War: Between Appearance and Reality in the Computer Game]* (2002).
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> The third reason for the variety of books is a growing interest in computer games as cultural phenomena. The first impressive works of human scientists about games have been published (for example, Claus Pias's *Computer Spiel Welten [Computer Game Worlds]* (2002). That this new perspective on games is also growing among museums and within the German game industry is shown by two exhibitions and catalogs (Förderverein für Jugend- und Sozialarbeit, Verband der Unterhaltungssoftware Deutschland, 2002; Museum für Sepulkralkultur, 2002).[35]

While there is growing cross-fertilization of ideas and academic debate between scholars of Europe and the Americas, there is much less so between Western countries and Japan. Part of the reason is the availability of writings translated into English, as well as the emphasis on game design and production as opposed to academic study of video games. According to Matthew Weise, a game researcher on MIT's Games-to-Teach Project team:

> As for existing writing available in English, I can only point to interviews with and lectures by Japanese video game designers. Shigeru Miyomoto, creator of Mario and Zelda, has spoken a number of times at game shows and conferences worldwide, and he is probably the closest thing to a Japanese video game designer (that I'm aware of) who frames his ideas in way that sound like what to a westerner would sound like "theory." Hideo Kojima, creator of *Metal Gear,* has spoken (mostly in interviews) in a similar fashion.[36]

In any event, the increasing number of books, periodicals, and conferences on video games suggests that an international network of video game researchers is forming, and that video game theory as an academic field is coming into existence. As it does, the question remains as to when (and perhaps if) agree-upon theoretical foundations and a common vocabulary will arise among the international research community. While it is certainly beyond the scope of this introduction to attempt to address such a question in full, we might examine a few possible starting points.

Basic Elements of Video Game Theory

As a multidisciplinary field of research, video game theory, by nature, must be a synthesis of a wide range of approaches, but at the same time focus on the unique aspects of video games. As Espen Aarseth wrote at the end of his

editorial in the first issue of *Game Studies:*

> Of course, games should also be studied within existing fields and departments, such as Media Studies, Sociology, and English, to name a few. But games are too important to be left to these fields. (And they did have thirty years in which they did nothing!) Like architecture, which contains but cannot be reduced to art history, games studies should contain media studies, aesthetics, sociology etc. But it should exist as an independent academic structure, because it cannot be reduced to any of the above.[37]

Indeed. Nor can the video game be seen only as a remediation of film, television, computers, or even games. The irreducibility of the video game is precisely why it has been hard to define formally and why there is heated discussion not only around what it *should be,* but also around what exactly it *is.* While a spectrum of definitions are already in use by academics, gamers, retailers, and designers, we can begin by trying to find essential elements that are generally agreed upon as constituting a "video game."

Probably everyone would agree that *PONG* (1972) is a video game. As video games go, it is hard to imagine a commercially feasible game that is simpler than *PONG.* Therefore, *PONG* can be seen as fulfilling the criteria for a video game in the most minimal way possible. What does *PONG* consist of? Competing players had to return the bouncing ball as in table tennis; players were restricted to vertical movement; game play took place on a video monitor; and a score was kept that determined who won and who lost. While detailed discussions of how the term "video game" can be defined exist elsewhere,[38] we can, from these basic features, begin to demarcate what we mean when we say something is a video game. Of the first half of the term, "video" would seem to require that game action appear in some visual form on a screen (although "video" originally referred to the cathode ray tubes [CRTs], which were used in arcade games and home video games, handheld games with pixel-based displays also are now commonly referred to as video games). The second half of the term, "game," is less easily defined. Attempts to define it generally refer to the definition given by Johan Huizinga in his famous *Homo Ludens: A Study of the Play-Element in Culture* ([1938] 1950) or to works ranging from Roger Caillois' *Man, Play, and Games* ([1958] 1961) to Elliott M. Avedon and Brian Sutton-Smith's *The Study of Games* (1971), and to recent works specific to video games by Gonzalo Frasca, for instance.[39]

Of all the various approaches that have been taken in defining the video game, a few elements seem to appear persistently, under various names and descriptions. These elements are at the heart of what makes the video game a unique medium, and need to be addressed in any discussion of them. The most fundamental of these elements are: an *algorithm, player activity, interface,* and *graphics.*

The simplest of the four to define is *graphics,* which refers to some kind of changing and changeable visual display on a screen, involving some kind of pixel-based imaging. Graphics seem to be required, after all, if a game is to be a "video" game (but, as noted earlier, they are not necessarily a criterion for a "computer" game or an "electronic" game, although the majority of them do have graphics[40]). Although not explicitly mentioned in many definitions of "video game," there is almost always an implicit assumption that some form of graphics will be present. One also would expect the video game's graphics to differ from imagery in print or on film in that they are on an electronic screen of some kind (a CRT, an LED or LCD screen, for example) and have some moving component under player control.

Graphics should not be confused with the next element, the *interface,* since an interface may or may not contain graphics just as not all graphics represent an interface. The interface occurs at the boundary between the player and the video game itself, and can include such things as the screen, speakers (and microphones), input devices (such as a keyboard, mouse, joystick, trak-ball, paddles, steering wheels, light guns, etc.), as well as onscreen graphical elements such as buttons, sliders, scroll bars, cursors, and so forth, which invite player activity and allow it to occur. The interface, then, is really a junction point between input and output, hardware and software, and the player and the material game itself, and the portal through which player activity occurs.

Player activity is arguably the heart of the video game experience, and perhaps the most important thing from a design perspective. It is the element of the video game that is most written about, and every theory of video games thus far seems to agree with the idea that without player activity, there would be no game. The nature of player activity is also necessarily *ergodic* (to use Espen Aarseth's term) or nontrivial and extranoematic, that is, the action has some physical aspect to it and is not strictly an activity occurring purely on the mental plane. Player activity is input by means of the user interface, and is limited and usually quantized by it as well. We could further divide player activity into two separate areas, diegetic activity (what the player's avatar does as a result of player activity) and extradiegetic activity (what the player is physically doing to achieve a certain result). The two should not be conflated, as the translation from one to the other can differ greatly. For example, some shooting games could move a gunsight about with a joystick and use a button to fire, while another could use a controller shaped like a handgun for the same input; the onscreen action could be the same, while the means of input vary. Likewise, the joystick is used to input a wide variety of onscreen actions, including steering, rotating a point of view, or choosing from a menu.

Finally, at the heart of every video game program is an *algorithm,* the program containing the set of procedures controlling the game's graphics

and sound, the input and output engaging the players, and the behavior of the computer-controlled players within the game. Dividing up its tasks, we could say that the algorithm is responsible for the *representation, responses, rules,* and *randomness* that make up a game. *Representation* is the rendering of the game's graphics, sounds, and gameplay (and the simulation of its diegetic world, if it has one), and the unification of them that make for a persistent and coherent player experience. *Responses* include the actions and reactions made by the algorithm in response to the changing situations and data within the game. This includes control of game events and non-player characters, as well as the on-screen action of the player's avatar, the action of which is determined by the player's input. *Rules* are the limitations imposed upon and determining the game's activities and representations, which regulate responses and gameplay. Even the most abstract video games or open-ended ones have some kind of rules, even if they are merely limitations on what the player can do within the context of the game. Finally, most games have some element of *randomness* (or "unpredictability," perhaps, since true randomness is computationally impossible). Randomness keeps the game from being exactly the same every time it is played, keeping players guessing and the game interesting, through the variation of events and the times and order in which they occur. Strictly speaking, randomness is not a necessary element; puzzle games and games which rely heavily on narrative and are generally played only once may contain little or no randomness (like *Myst* [1993], *Gadget* [1993], or *Star Trek: Borg* [1996], for example). But most games have some degree of randomness, to keep the game from boring predictability (most computer chess games, for example, will not use the same opening every time).

These four basic elements, the *algorithm, player activity, interface,* and *graphics,* are often referred to in discussions of video games, though the terminology used varies. For example, in *Hamlet on the Holodeck: The Future of Narrative in Cyberspace* (1997), after describing her experience of playing the laserdisc arcade movie game *Mad Dog McCree* (1990), Janet Murray pointed out four essential properties of digital environments:

> Digital environments are procedural, participatory, spatial, and encyclopedic. The first two properties make up most of what we mean by the vaguely used word *interactive*; the remaining two properties help to make digital creations seem as explorable and extensive as the actual world, making up much of what we mean when we say that cyberspace is *immersive*.[41]

What Murray calls procedural[42] and participatory can be mapped onto what Lev Manovich, in *The Language of New Media* (2001), identifies as algorithmic, whereas Murray's spatial and encyclopedic aspects coincide with Manovich's idea of navigable space and the database:

> Of course, not all media objects are explicitly databases. Computer games, for instance, are experienced by their players as narratives. In games, the player is given a well-defined task-winning the match, being first in a race, reaching the last level, or attaining the highest score. It is this task that makes the player experience the game as a narrative. Everything that happens to her in a game, all the characters and objects she encounters, either take her closer to achieving the goal or further away from it. Thus, in contrast to a CD-ROM and Web database, which always appear arbitrary because the user knows additional material could have been added without modifying the logic, in a game, from the user's point of view, all the elements are motivated (i.e., their presence is justified). . . . While computer games do not follow a database logic, they appear to be ruled by another logic—that of the algorithm. They demand that a player execute an algorithm in order to win.[43]

In both cases, the use of a spatial metaphor is indirectly reliant upon the presence of graphics, though neither acknowledges this overtly. The similarities between some of Murray's and Manovich's ideas and their differences in terminology is a good example of the diversity of approaches and lack of a common terminology that can be found in the writings converging in the area we could call video game theory. As video game theory begins to demarcate its territory and conceptual overlaps become apparent, the field may finally begin to coalesce and define itself. In the thirteen essays that follow, one can already see shared ideas, themes, and concepts despite the different disciplines out of which they arise.

Essays from Around the World

Featuring the work of sixteen scholars from eight countries,[44] this anthology is a sampling of the wide range of approaches being brought to the study of video games, and suggests a potential for interdisciplinary dialogue. The first essay, "Theory by Design" by Walter Holland, Henry Jenkins, and Kurt Squire, explores how the gap between theory and practice might be bridged in the context of emerging media technology. "What happens when theorists become game designers?" they ask, and "How does the design task force them to reconsider their theoretical assumptions?" The essay describes the work of MIT's Games-to-Teach Project, which examines the challenges and potential of edutainment with the goal of developing conceptual prototypes for games outside of a commercial context. Design is also the topic of the next essay, Mark J. P. Wolf's "Abstraction in the Video Game," which looks at graphical abstraction in games. Ever since the early days, when technological limitations severely restricted graphical detail, game design has pushed

toward more representational imagery, and has ignored the possibilities offered by abstraction. Wolf's essay looks at how abstraction was used and how it related to game design, suggesting that much potential for the use of abstraction remains untapped. As the video game moves beyond the relatively narrow stylistic palette conformed to by most commercial games, its potential as art, educational tool, and training simulation will perhaps be better realized.

One of the main concerns of video game design is the relationship the game has to the player, including such things as the interface, the avatar, and the way the player is positioned by the game. Alison McMahan's essay, "Immersion, Engagement, and Presence: A Method For Analyzing 3-D Video Games," examines ideas behind the terminology surrounding the notion of "presence" and how it has been defined, and then constructs a model for analyzing the degree of presence enabled by a particular video game using aesthetic criteria. Closely tied to the notion of "presence" is that of "identity," which Miroslaw Filiciak examines in "Hyperidentities: Postmodern Identity Patterns and Massively Multiplayer Online Role-Playing Games." Filiciak suggests that the use of online personae is analogous to the postmodern condition of multiple or split identities and networked selves, taking his examples from the worlds of role-playing games in which hundreds of thousands of players have avatars embodying their online identities.

Expanding in a different direction regarding identity and the avatar, Bob Rehak's "Playing at Being: Psychoanalysis and the Avatar" traces the evolution of avatars from the earliest games to current first-person shooting games, revealing a symptomatic concern with the onscreen body's capabilities and vulnerabilities, as well as its relationship to player corporeality. His essay shows how suturing effects of point-of-view in the first-person shooting games constitute a powerful interpellative system in which players take on avatarial perspectives as their own, using film theory and psychoanalytic concepts to explore this aspect of avatarial operations. Cognitive psychology also can be applied to the study of video games, and in "Stories for Eye, Ear, and Muscles: Video Games, Media, and Embodied Experiences," Torben Grodal argues that computer games and other types of interactive virtual reality are simulations of basic modes of real-life experiences. He suggests that the tools of cognitive psychology are more successful at describing video games than those used in a semiotic approach, since most game activity consists of seeing, hearing, and doing in simulations of real-world interaction.

Taking up the theme of embodied experience, Martti Lahti's essay "As We Become Machines: Corporealized Pleasures in Video Games" explores how video games construct a new relationship between corporeal experience and subjectivity, and the role of the technology and the interface in the process. The way that video games allow the player to try out (at least in a virtual

sense) different bodies, races, genders, and sexualities is also discussed in Mia Consalvo's essay "Hot Dates and Fairy-Tale Romances: Studying Sexuality in Video Games," which looks at the construction of sexuality and the way it is represented in a game's characters, narratives, visuals, and situations, and the presumed worldviews they imply, and the impact on the game's storyline and players' performances.

In "Video Games and Configurative Performances," Markku Eskelinen and Ragnhild Tronstad look at video games as remediated games and see a continuum between video games and ergodic art. They compare the performative aspects of video games with that of theater, performance art, and Allen Kaprow's notion of the Happening, and examine the distribution of information and modalities of action in video games, including such things as motivation, exposition, and orientation. Moving from performance to simulation, Gonzalo Frasca's essay, "Simulation versus Narrative: Introduction to Ludology," also contests the necessity of narrative in video games, arguing for an approach that views games as simulations instead of representational narratives. He compares the characteristics of video games with those of traditional media, and demonstrates a variety of ways that an author can use a video game as a vehicle for the expression of an ideology, through the rules that regulate gameplay and the game's possible outcomes, suggesting that the video game is ripe for use as a rhetorical tool for art, philosophy, and education. Also writing from the standpoint of ludology, Bernard Perron's essay "From Gamers to Players and Gameplayers: The Example of Interactive Movies" examines the bipolarity of the range of games from "paidia" to "ludus." Basing his argument on the ludic attitudes at play during movie games and interactive movies, he attempts to lay out a common terminology that would articulate the distinction between players and gamers more accurately, and applies his ideas to the genre of "interactive movies," which attempts to combine storytelling and interactivity. "Interactive Storytelling" is the subject and title of Chris Crawford's essay, which begins by surveying early attempts to combine interactivity and storytelling and the resulting models. Following his survey, he proposes his own model for an interactive storytelling engine, and describes its functioning.

Narrative is also one of the main concerns of the last essay in the anthology. Patrick Crogan's paper, "Gametime: History, Narrative, and Temporality in *Combat Flight Simulator 2*," traces the connections between war-related computer games and recent Hollywood war films, exploring key aspects of the transformation of mainstream visual culture under the impact of computer-based digital imaging. With a particular focus on the game Microsoft *Combat Flight Simulator 2: WW II Pacific Theater* (2000) and the movie *Pearl Harbor* (2001), his essay draws out some of the implications of this relation between war and imaging for the analysis of visual culture, and

ways in which video games can act as training for action in the real world, as well as ways video games can remediate history.

Finally, to help situate the study of home video games historically, we include an Appendix listing home video game systems that have appeared over the last three decades. Whereas most video game study focuses on more recent games, due in large part to their more complex and detailed content as well as their availability, this list is a good reminder of the rich history the video game has, much of which has yet to be addressed by historians and theoreticians.

On to the Next Level: Future Directions of Study

As the field of video game studies grows, it may well find its way to the center of media studies, as games eclipse other forms of digital technology and art. As Henry Jenkins argues:

> Games represent a new lively art, one as appropriate for the digital age as those earlier media were for the machine age. They open up new aesthetic experiences and transform the computer screen into a realm of experimentation and innovation that is broadly accessible. And games have been embraced by a public that has otherwise been unimpressed by much of what passes for digital art. Much as the salon arts of the 1920s seemed sterile alongside the vitality and inventiveness of popular culture, contemporary efforts to create interactive narrative through modernist hypertext or avant-garde installation art seem lifeless and pretentious alongside the creativity and exploration, the sense of fun and wonder, that game designers bring to their craft.[45]

As both game designers and theorists explore the possibilities and potential that the video game has to offer, and historians begin to record where the video game has been and what it was, new strains of formal exploration may emerge, much as experimental cinema or electronic music led in directions away from mainstream industry productions, while at the same time exerting their influence on them and indicating future avenues for development.

Like an endlessly scrolling adventure game map, so much territory remains to be explored. The production of video games calls for an account of the video game's economical and political functions, and the ideologies that shape games as well as those for which the games are propaganda. The reception of games will have to be examined; how are they played, received, understood, and interpreted by the players. The international popularity of video games will require that they be viewed in a larger cultural and geographical landscape. And the cultural landscape is broad; with the integration of video games into operating systems, cell phones, PDAs, and practically every type of electronic screen technology available, video games have a ubiquity and availability unlike any other medium in history.

And the many uses of video games are also being explored. MIT's Games-to-Teach Project and George Kosmetzsky's I.C. Squared are both researching ways that video games can be used in education and training. The increasing availability of digital media-producing tools and programs means more individual production is possible, and perhaps even an avant garde of experimental game designing will be able to arise outside of mainstream commercial production. Already, younger scholars such as Jesper Juul (<www.soup.dk>) or game designers such as Eric Zimmerman (<www.gmlb.com>) are making games as well as developing their theoretical approaches. Just as simulations can embody theoretical ideas, perhaps games embodying theories will someday hold as vaunted a position in academia as the book and the film does today. Whatever the case, it is clear that the video game is an important part of popular culture and will likely remain so for some time to come, regardless of the future forms that it may take.

Notes

1. In a 2001 interview in *Joystick101.org*, Steven Poole, the author of *Trigger Happy: The Inner Life of Videogames*, gave evidence of the remaining resistance: "There has been a small current of dissent, however, with the common theme that my attempt to place videogames in a wider cultural context by relating them to film theory, semiotics and so on is just 'pretentious.' This is a criticism I don't really understand, and I don't think anyone will think it's pretentious in 50 years, when videogame criticism has attained the same status as film criticism has now. A minority of hardcore gamers have resisted the idea of their pet hobby being analysed and explained by someone who is in their eyes an 'outsider,' but I don't apologise for that." In Kurt Squire, "Interview with Steven Poole, Author of Trigger Happy," *Joystick 101.org* (January 24, 2001). Available online at <http://www.joystick101.org/?op=displaystory&sid=2001/1/16/174911/133>.

   The gaming community also can be hostile toward the theorizing of video games. The premiere issue of the first academic peer-reviewed online journal *Game Studies* provoked a harsh response from the gamers at *slashdot.org*. See <http://slashdot.org/articles/01/08/03/1147242.shtml>.
2. And protected. See Henry Jenkins, "Power to the Players: Why video games need the protection of the First Amendment," *Technology Review* (June 7, 2002). Available online at <http://www.technologyreview.com/articles/wo_jenkins060702.asp>.
3. The first chapter of Wolf's book *The Medium of the Video Game* deals with the definition of "video game," looking at the range popular uses of the term. See *The Medium of the Video Game*, ed. Mark J. P. Wolf (Austin: University of Texas Press, 2001).
4. The first three times the subject heading "Video Games" appeared in the *Reader's Guide*, it was merely followed by "See Electronic Games."
5. Although the two terms are often used interchangeably, a distinction between them could be made; "computer games" would not require any visuals, while "video games" would not require a microprocessor (or whatever one wanted to define as essential for being referred to as a "computer"). The board game *Stop Thief* (1979), for example, has a handheld computer that makes sounds that relate to game play on the board. Therefore the game could be considered a computer game, but not a video game. More of these kinds of games exist than games that involve video but not a computer, making "video games" the more exclusive term. "Video games" is also more accurate in regard to what kinds of games are meant when the term is used in common parlance.

   Another blurred boundary arises when one considers the place of text adventure games, which are made up solely of text. While the distinction between text adventures and graphical

adventure games remains (and is a useful and logical distinction), text displayed on a monitor screen is arguably also a visual display and a form of computer graphics.

6. Donald D. Spencer, *Game Playing with Computers* (New York: Spartan Books, 1968); and A. G. Bell, *Games Playing With Computers* (London: George Allen & Unwin Ltd., 1972).
7. Bell, *Games Playing With Computers,* 10–11.
8. For a list of early books on video games, a good source is Lee K. Seitz's Classic Video Games Literature List. Available online at <http://fly.hiwaay.net/~lseitz/cvg/cvglit.shtml>.
9. A list of these magazines can be found at <http://www.digitpress.com/faq/vgmags.txt>.
10. Warren Robinett began work on *Adventure* in 1978, which, according to him, gives some validity to the copyright date of 1978 found on the Atari cartridge and manual for *Adventure.* But the actual code was finished and turned over to Atari in June of 1979, making 1979 the actual year of release. Going by the copyright date found in the game manual and cartridge, I mistakenly gave 1978 as the date of release in the initial print run of *The Medium of the Video Game.*
11. Chris Crawford, *The Art of Computer Game Design* (Electronic Version, 1984), 1. Available onilne at <http://www.vancouver.wsu.edu/fac/peabody/game-book/Coverpage.html>.
12. Crawford, *The Art of Computer Game Design,* 87.
13. Craig A. Anderson and Karen Dill, "Video Games and Aggressive Thoughts, Feelings, and Behavior in the Laboratory and in Life," *Journal of Personality and Social Psychology* 78, no 4 (April 2000): 772–790. Available online at <http://www.apa.org/journals/psp/psp784772.html>.
14. See Rochelle Slovin, "Hot Circuits: Reflections on the 1989 Video Game Exhibition of the American Museum of the Moving Image," in Wolf, *The Medium of the Video Game,* 137–154.
15. See Charles Bernstein, "Play it Again, Pac-Man," in Wolf, *The Medium of the Video Game,* 155–168.
16. For more on *The Last Starfighter* game that was almost made, see *The Last Starfighter* FAQ. Available online at <http://www.paulbunyan.net/users/wayland/arcade/laststar.html>.
17. About the symbiosis between the film and video game industries, see, for instance, Sue Adamo, "Hollywood is Game," *Film Comment* 19, no 1 (January/February, 1983): 40–41; Marc Graser, "New Playground for Studios," *Variety,* May 17, 1999, available online at <http://www.findarticles.com/cf_0/m1312/1_375/54701191/print.jhtml>; Marc Graser, "H'W'D Can't Crash Vidgames (motion pictures inspired by video games)," *Variety,* August 9, 1999, available online at <http://www.findarticles.com/cf_0/m1312/12_375/55578478/print.jhtml>; and Josh Spector, "Hollywood puts on its game face," *Hollywood Reporter,* daily electronic edition, June 1, 2001, 2.
18. Prior to the CD-ROM, only laserdisc games featured full-motion video clips, overlaying computer graphics over them or creating games entirely from them. Sega's *Astron Belt* introduced the technology in Japan in 1982 and later in America in 1983, the same year that Cinematronic's *Dragon's Lair,* the first successful laserdisc game, appeared. In 1984, Rick Dyer created a home laserdisc game system, the RDI Halcyon, that also used full-motion video. For a nice summary of the rise and fall of laserdisc games and information on individual games, see <http://www.atarihq.com/coinops/laser/>.
19. Greg M. Smith, "Introduction: A Few Words about Interactivity," in *On a Silver Platter. CD-ROMs and the Promises of a New Technology,* ed. Greg M. Smith (New York: New York University Press, 1999), 2.
20. Smith, "Introduction: A Few Words about Interactivity," 2. The anthology begins to make up for this oversight by studying *Phantasmagoria, Civilization II, Sim City 2000,* and *Sim Town.*
21. *Doom* was released as shareware in 1993 before it appeared commercially.
22. From the *Catalog for Academic Year 2001–2002,* Digipen Institute of Technology, Redmond, Washington, 6.
23. The Le Diberders underscored an important fact:

> The project of this book is born from the observation that analysis [of video games] did not precisely exist. The specialized press proliferates, but for the exclusive usage of an already convinced community. While the one who wants to document himself on the sailing board or on the manufacture of lampshades in leather has a suitable bibliography, the favorite leisure of several tens of millions of Westerners remains largely a *terra incognita* for parents wanting to understand.

In Alain and Frédéric Le Diberder, *Qui a peur des jeux vidéo?* (Paris: La Découverte/Essais, 1993), 8. Freely translated.

24. Another French book about pedagogy was published with the same objective in 1994. Évelyne Esther Gabriel's *Que faire avec les jeux vidéo?* [What to Do with Video Games?] (Paris: Hachette, 1994) was wishing to rehabilitate the player and the spirit of play and to show that the teacher would gain something from the ludic to the pedagogic.
25. Alain Le Diberder, "L'interactivité, une nouvelle frontière du cinéma," (Dossier: Numérique, Virtuel, Interactif. Demain le Cinéma) *Cahiers du Cinéma* 503 (June 1996): 122–126.
26. Erwan Higuinen and Charles Tesson, "Éditorial: Cinéphiles et Ludophiles," (Jeux Vidéo) *Cahiers du Cinéma* Hors-Série (September 2002): 5. Freely translated.
27. Espen Aarseth, *Cybertext: Perspectives on Ergodic Literature* (Baltimore and London: Johns Hopkins University Press, 1997), 4–5.
28. Although the majority of the original eleven members of the *Game Studies* team were present at the first DAC conference, it was after the third conference in 2000 that the preparation for the launching of the first academic peer-reviewed online journal began. *Game Studies* was launched in July 2001 with a specific mission: "To explore the rich cultural genre of games; to give scholars a peer-reviewed forum for their ideas and theories; to provide an academic channel for the ongoing discussions on games and gaming" (<http://www.gamestudies.org/about.html>).
29. Justine Cassell and Henry Jenkins, "Chess For Girls? Feminism and Computers Games," in *From Barbie to Mortal Kombat: Gender and Computer Games,* eds. Justine Cassell and Henry Jenkins (Cambridge, MA: MIT Press, 1998), 5.
30. Thanks to Henry Jenkins for this reference.
31. For a list of schools, see for instance <http://www.gamasutra.com/php-bin/companies.php3?cat=153138>.
32. Conservation of screen direction, sound perspective, sound, and narrative are also not essential to film, yet one does not find film scholars vehemently arguing that film is not narrative and should not be considered as such. But claims like these are made in the narrative versus interactivity debates among video game theorists.
33. For example, see the discussions of "interactivity" in Aarseth, *Cybertext: Perspectives on Ergodic Literature;* Mark J. P. Wolf, *Abstracting Reality: Art, Communication, and Cognition in the Digital Age* (Lanham, MA: University Press of America, 2000); and Lev Manovich, *The Language of New Media* (Cambridge, MA: MIT Press, 2001).
34. Previous conferences, such as MIT's *Computer and Video Games Come of Age: A National Conference to Explore the State of an Emerging Entertainment Medium* held in February 2000, mixed industry professionals, software designers, and scholars of media and culture. As to the international makeup of the Game Studies crew, Markku Eskelinen has described the original eleven members as "3 Norwegians, 2 Danes, 2 Finns and one each from Uruguay, Spain, Germany and the U.S/Switzerland." E-mail correspondence with the editors.
35. An annotated list of German publications on video games by Konrad Lischka is available from the editors, at <mark.wolf@cuw.edu> or <bernard.perron@umontreal.ca>.
36. E-mail correspondence with the editors.
37. Espen Aarseth, "Computer Games Studies, Year One," *Game Studies* 1, no 1 (July 2001). Available online at <http://www.gamestudies.org/0101/editorial.html>.
38. For examples of detailed discussions of how the term "video game" can be defined, see the section "Defining the Video Game" in Chapter One of Wolf, *The Medium of the Video Game,* and "Towards a Definition of "Videogames," *Videotopia.com* (1998–99). Available online at <http://www.videotopia.com/errata1.htm>.
39. See Frasca's website <http//:www.ludology.org>.
40. See note 5.
41. Janet H. Murray, *Hamlet on the Holodeck. The Future of Narrative in Cyberspace* (New York: The Free Press, 1997), 71.
42. "Authorship in electronic media is procedural. Procedural authorship means writing the rules by which the texts appear as well as writing the texts themselves. It means writing the rules for the interactor's involvement, that is, the conditions under which things will happen in response to the participant's actions. It means establishing the properties of the objects and potential objects in the virtual world and the formulas for how they will relate to one another.

The procedural author creates not just a set of scenes but a world of narrative possibilities." Murray, *Hamlet on the Holodeck. The Future of Narrative in Cyberspace,* 152–153.

43. Manovich, *The Language of New Media,* 221–222.
44. Australia, Canada, Denmark, Finland, Norway, Poland, the United States, and Uruguay.
45. Henry Jenkins, "Games, the New Lively Art," in *Handbook of Computer Game Studies,* eds. Jeffrey Goldstein and Joost Raessens (Cambridge, MA: MIT Press, forthcoming). Available online at <http://web.mit.edu/21fms/www/faculty/henry3/GamesNewLively.html>.