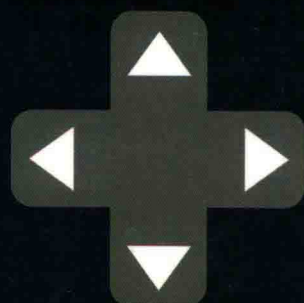
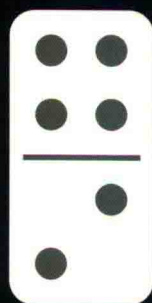
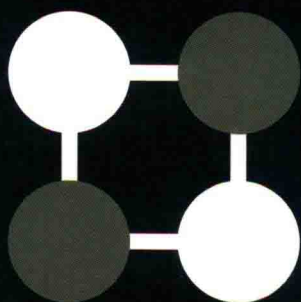


GAME DESIGN THEORY



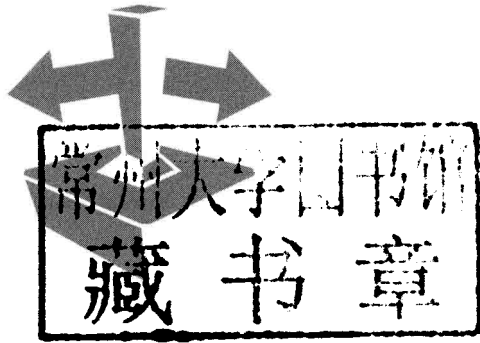
A New Philosophy
for Understanding Games

Keith Burgun

 CRC Press
Taylor & Francis Group
AN A K PETERS BOOK

Game Design Theory

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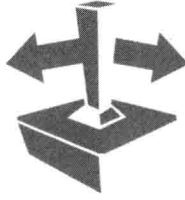
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Game Design Theory



Foreword

Some recent research suggests that by the age of 20, the majority of Americans have spent as much time playing video games as they have spent time at school—and I guess other countries are catching up fast. I find this remarkable! Others may find it frightening....

Certainly, these findings represent a great challenge (and a great responsibility) to those of us who are game designers. If we can reach and influence so many people with our games, what are we doing with this influence?

In recent decades, games have become increasingly popular and have grown to be a significant market force. The emergence of powerful video games has boosted the popularity and attractiveness—some call it addictiveness—of games as a meaningful pastime. Today the games industry is larger than either the movie industry or the music industry, and games now compete with books for the top revenues in the entertainment business. As a member of the games industry, I find these developments remarkable too (although members of the other industries may find them unnerving).

This revolution goes far beyond the traditional scope of playing games. Our smartphones offer us a half-million games at our fingertips, many of them for free. Games have taken social communities, such as

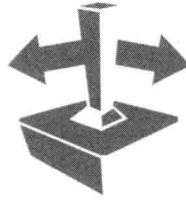
Facebook, by storm, involving millions of players in a single gaming experience. The online role-playing game *World of Warcraft* alone attracts millions of players, who collectively have spent more than six million years on the game—and counting. This is comparable to mankind’s total global effort in putting a man on the moon!

Of course, the amazing success of games has not gone unnoticed by the rest of the world. Today we can see how the attractiveness of gaming elements has resulted in them being applied to many areas of our lives: enticing incentive programs, motivating fitness programs, and ever-present leaderboards are all popular manifestations of this “gamification” process. Games have become truly global!

However, despite the rise of games and gamers, the creative game design process remains largely unstructured. Game designers are often self-taught, or serve apprenticeships under more experienced designers. They each develop their own methods of design, their own vocabularies, and their own toolboxes of tricks to identify and fix problems. Unlike literature and music, which stand on solid theoretical foundations, game design theory is much less developed. Game designers are artists, and each has his or her own philosophy of how to squeeze the most fun and enjoyment out of a game box.

It is possible that thought-provoking books such as this one may be just the spark required to kick start an industry revolution in game design.

—Reiner Knizia
London, England
March 2012



Introduction

The Death of *Tetris*



You don't need to be an expert on the topic of games to have a sense of the level of elegance, brilliance, and importance of *Tetris*. An abstract, score-based game based on fitting various four-block shapes (known as *tetriminos*—or *tetriminos*, in the parlance of *Tetris*) into each other to create lines (filled horizontal lines that go across the *well*, or playing field) took the world by storm in the mid-1980s, exploding even further with the release of the Nintendo Game Boy version in 1989.

What makes *Tetris* so brilliant? With so few gameplay elements, it would seem as though the game would be simple and mastery would be easy, but that's far from the case. *Tetris* has achieved the game design feat of “easy to learn, difficult to master” more than most video games—it is incredibly intuitive to learn, and yet I've been playing it for over 20 years and I am still learning things all the time.

The depth of *Tetris* is found in several aspects of its gameplay, but two specific areas stand out. The first is learning about relationships between pieces and pile shapes: for instance, you often can use an L-tetrimino in a somewhat nonintuitive way to help you build towards clearing four lines at once—a *tetris* (Figure 1).

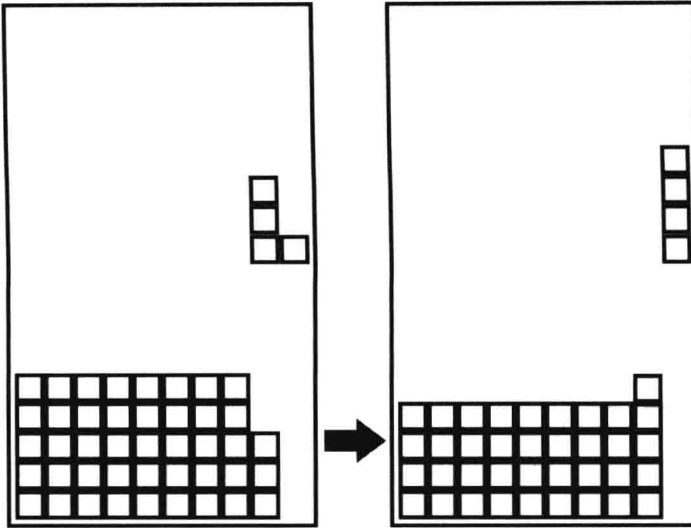


Figure 1. An example of a nonintuitive, yet strategic move in *Tetris*. New players may not realize that this is a solid way to set themselves up for a tetris.

The second, even more significant area of mastery is risk management. You see, *Tetris* generates random tetriminos each time, and so there are often times when you have to make a “push your luck” sort of decision in order to get a better score. For instance, take a look at the scenario in Figure 2.

In the situation illustrated in Figure 2, you could make the safe play and flip the L-piece twice so that it fits in and gives you a nice, safe triple that provides a little wiggle room. The downside, however, is that you lose an opportunity for a tetris, which is worth far more points. The points you lose will be even greater if you’re at a higher level (which may well be the case, given that the pile is so high). So, you can *choose* to push your luck by making the play from Figure 1 and waiting for the line piece you need. The thing is, due to the random generator you don’t know exactly when that line piece will be coming—it may be two pieces away, or it might be thirty pieces away, and you have no way of knowing! This randomness means you constantly have to adapt to the system, making the outcome of decisions more uncertain.

Perhaps some readers will say, well, at that height I would certainly go for the triple and go into clean-up mode. That’s reasonable. But what if the pile was two tiles lower than it is in Figure 2? What if it was three or four tiles lower? There is no firm line at which a player *must* begin to play it safe, and sometimes taking a big risk has a big payoff.

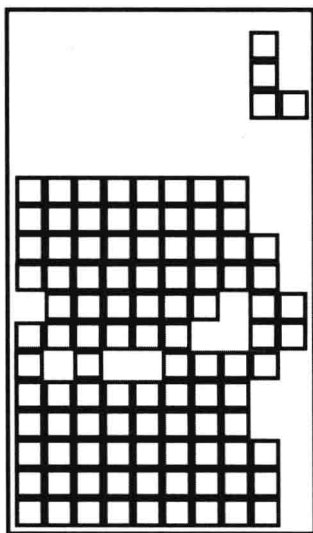


Figure 2. A higher stakes situation in *Tetris*.

Tetris was packaged with the Nintendo Game Boy, and for many people the game went into the system when they first got the Game Boy and it remained there. The game's deep, elegant mechanisms combined with its random piece-generator meant that it always had something new to teach—it always was putting players in positions that they hadn't totally learned to deal with yet.

At least, that used to be the case.

Starting around the turn of the millennium *Tetris* started to change. Newer versions added all kinds of features that seemed to do everything in their power to take that ambiguous-decision quality away from the game. Instead of the normal single *next box* (a very helpful user-interface (UI) space that showed which piece was coming up next), we started getting three next boxes—then four, or five. Now many versions have six, meaning that there is absolutely no uncertainty about how the next six moves will play out.

If that wasn't enough, a feature called the *hold box* was added. The hold box allows players to save one piece for later: at any time, players can swap out a current piece for the piece in the hold box. This change almost completely destroys the dilemma inherent in dealing with combinations of pieces and piles that players don't know how to manipulate.

The game takes further abuse from another new feature called *easy spin*. Although this doesn't directly affect the decision-making aspect of the game, it does remove the element of tension that goes with each

piece having a “timer.” Easy spin allows players to spin a piece at the bottom of the well *indefinitely*, giving them unlimited time to decide where to actually put that piece.

But possibly one of the most offensive and least talked about changes is how the random generator works. Early versions of the *Tetris* generator either worked completely randomly, or had a very slight cap on repetition so that you wouldn’t get the same piece ten times in a row. But now there is something called the *7-Bag*, which works by putting all seven tetrimino possibilities into a bag and drawing them one at a time. This system guarantees that you will get one of each piece every seven pieces, and makes piece generation completely regular and dependable. It’s funny how the modifying of such a behind-the-scenes, small mathematical algorithm can completely change the nature of a game, but that’s what happened. This feature was the final mortal blow to any uncertainty in decision making, and it shows just how fragile a game really is.

These new features have added up to a new reality: that decision making in modern *Tetris* is actually pretty trivial. Instead modern *Tetris* has become more of an execution and reaction contest—almost akin to a rhythm challenge like *Dance Dance Revolution*. Today’s serious *Tetris* players play versions of the game that fire pieces at incredible speeds (five or more per second). Knowing where to put the pieces is not very important: it’s just a matter of *doing it in time*. For those who play the newer games at normal speeds, the game is ridiculously easy and gets boring well before they’re ever threatened. Modern *Tetris* isn’t even close to being the same game that we fell in love with in the 1980s and 1990s. The original *Tetris* was one of the most important examples of digital game design excellence, and yet today it’s very difficult to access or find a version of the game without the new features. How could we let this happen?

The reason is that we never understood collectively what was so great about *Tetris* in the first place. We never “got” the game, oftentimes calling it a puzzle, ostensibly because the pieces fit together somewhat like those in a jigsaw puzzle. We didn’t even really know what we meant by *puzzle*, and we didn’t know what we meant by *game*—the two terms were often interchangeable. We enjoyed the software but we didn’t know *why* we enjoyed it, and now we’ve made what was great about it inaccessible to a whole generation: a generation that will grow up thinking that *Tetris* is boring. And they’re right: the version they have access to is forgettable and lacks those hooks that kept players tied in for so many years. The game that *Tetris* was inadvertently has been lost, and that’s why I’m writing this book.

Our Story



Games have always been important to people, but for nearly the entire history of human civilization making games has never been an established craft in the way that music, writing, and the visual arts have been. People have always created games, of course, but until recently there has never been a specific class called *game designer*. We game designers haven't had our Bachs or our DaVincis, people who established guidelines and principles for how our craft really works in a scientific and reproducible way. A sad fact about the world is that if you can't make a living doing something, very few people will pursue it seriously as a craft—so while each culture has followed its own evolution of creating sports, contests, and tabletop games, the evolution has been slow and the understanding superficial.

That changed dramatically in the 20th century. We suddenly find ourselves in an era in which being a game designer is actually a viable way to make a living, probably for the first time in human history. Why has this become the case only recently? One reason is that learning and exploring games takes a lot of time, and until recently people didn't have enough free time to learn a large number of them, limiting the demand for new games. Further, games could afford to be less complicated when free time was more rare.

So here we are—the very first generation of human beings to have been asked to satisfy the sort of demand we're seeing now. How are we doing? Actually, although it's completely understandable given the circumstances, we're in a very unstable, unhealthy, and unsustainable position with respect to how we view and create games. In short, we don't have any kind of established understanding about what games are, how they work, or what they ought to be. We're stuck in a place where all we can say is that some people like some games, and some people like other games. It's impossible for us to engage in any kind of productive discussion or critique of games, and we really can't progress until this problem is solved.

What is the solution? Essentially we're in a dark room, and right now everyone is afraid to reach out and try to touch something. The solution lies in game designers boldly saying *something* about games, in presenting their theories. There are a growing number of designers out there right now who are proposing hypotheses, which is a sign that we should have some optimism about the future of games.

My Story



Like many people, I grew up playing video games. Like slightly fewer people, I continued playing video games as an adult. I became part of

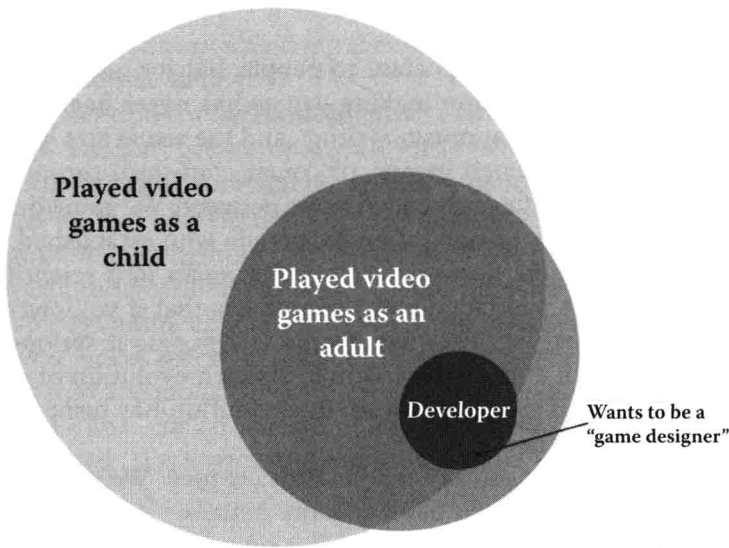


Figure 3. Distillation of a game designer.

an even smaller group when I decided that I wanted to create my own games. Finally, I entered an even tinier circle: I decided that I wanted to specialize in game design (Figure 3).

This last step is not that common among those who live in the digital world of games, and the reasons are clear. Many video gamers get into game development through computer-related disciplines—most commonly coding, since computer programming is the most significant practical aspect of bringing any kind of computer application into existence. Indeed, if you are a person who wants to make games, learning to program is the fastest way to start making that happen.

And that is what I did (sort of). In 1994, when I got my first computer, I immediately started tinkering with QBASIC, a variant of the BASIC language that came bundled with most versions of DOS. I used this language to create lots of little shooter games, fighting games, and other small experimental games. They were all very simple—some even simpler than they really should have been—and many were left unfinished. While I'd like to blame these things on the limitations of QBASIC, the truth is I just never developed a real love for programming: for me, programming was always just a means to an end. Nearly 20 years later, QBASIC is probably still my strongest language for this reason.

At a certain point I recognized something that some other people didn't seem to—creating a game on the computer had two very different

parts to it, and only one of them really interested me. Programming is implementation, but deciding *what* to implement was always what interested me. It seemed that a lot of people thought that this “what to implement” thing was trivial: instead they just copied some other game, tweaked one or two rules, and created new content. This formula never satisfied me, as I always felt that game design could be (and should be) something brilliant and fascinating in its own right. I soon found myself spending less and less time worrying about programming, and more and more time writing down rules for my game ideas with a pencil and paper. In hindsight, I don’t think I worried much about actually creating these games. What was important was that *I was designing games*.

Problem Statement



The death of *Tetris* is sadly only the tip of a much greater iceberg. History will not look back kindly on the popular digital games of today, which can be seen by looking back even five years. Who is still playing the hit games of 2007—such as *Bioshock*, *Call of Duty 4*, or *God of War 2*—in 2012? Not a whole lot of people. That number will continue to dwindle quickly over the next few years, and it would surprise me if more than a handful of people even know about those titles 25 years from now. Put simply, game designers generally are focused on creating games that will sell *today*, as opposed to games that will continue to be interesting tomorrow.

That’s not the worst of it, though. There are many terribly destructive trends in design that are causing tremendous damage to our designs and leaving players empty-handed. Even our best attempts at creating good games are plagued with features that ruin them, many of which are *expected* in new games. In short, the video games we play and love—even many that we know as the classics—have massive problems that they don’t need to (and before you assume that the independent game-development world is immune to these problems, let me tell you that sadly, they are not). I’ll describe these problems in detail in future chapters, but if you’re reading this with skepticism, ask yourself these questions:

- ♦ How interesting are the dungeon puzzles in the *Zelda* games?
- ♦ What effect does *quicksave* have on the game-playing experience?
- ♦ How good are the stories and writing in video games, really?
- ♦ If there’s no element of randomness in a single-player game, what does that do to its replay value?

These are far from the only issues, and are simply a few examples that provide a broad idea of the problem. I’ll be going into much more detail on all of these subjects later on in the book.

On Game Design



Game design is the development of the most fundamental aspect of a game: rules. It's obvious to most game developers that game design is not programming. It's also obvious that game design is not content creation (things like three-dimensional (3D) modeling, pixel art, music composition, sound effects, etc.). Writing, storytelling, and even character design are also not game design.

Put simply, game design is deciding what the game's *mechanisms* will be. There may be times when the game designer has to have a certain amount of influence over the visual art in a game (if it even has visual art), but that does not mean that visual art is an inherent part of game design. Any discipline requires us to step outside of the field sometimes to get something done. The fact that an architect sometimes has to deal with legal papers doesn't mean that law is a part of the discipline of architecture.

If you're interested in learning about game design, what can you do? Well, there are a number of books out there that you can buy, but nearly all of the game-design books I've seen are at the introductory level. It's very hard to find books that are more than loose, general, safe introductions to the art of game design. To understand game design, you need to read (and maybe even write) game design books with a *philosophy* behind them, but unfortunately, most of the books, blogs, and articles that are available steer clear of actually saying something bold about games.

My book is not that kind of book. I *do* have a point of view, and I think one of the things we need at this time are books that carefully illustrate new hypotheses on designing games, not ones that simply state that all thoughts on the matter are equally valid. No serious physicist reads *Physics for Dummies*: they read works that inhabit the cutting edge of understanding, that strive to further our comprehension of the subject. I want to read a game design book that has something to say. The fact is, game designers deal with very deep, very difficult concepts about the workings of human beings that ultimately no one has the answer to. Game design is an exploration, and we designers should have the courage to explore.

We need game design movements driven by a design philosophy. I'm not talking about genres or other, more superficial classifications. A quick look at art history yields examples of what I mean: realism, expressionism, dadaism, and cubism were all catalyzed by artists who had a real point of view about what art *should be*. It's about time that we in game design started to have the same kind of serious conversation. I reject the idea that everyone's opinion is equally correct—I think that there are

real answers about what games are, and how they work, waiting to be discovered. We just have to try.

Game Design Theory Today



Some may respond that this conversation has already been taking place. Well, yes and no. Over the past decade or so, a number of working game designers have written books about game design. Unfortunately, most of these are not about game design at all, but instead give advice on the practical aspects of game *development*. Some are essentially programming books, some are focused on making it in the industry, and some address other tangentially related topics. The number of game design books that are actually about game design is much smaller. Such books do exist, but I have yet to come across one that puts forth a bold vision: a philosophy of what games are and what they should be.

Challenges for Game Designers, written by Brenda Brathwaite (of Sir-Tech fame) and Ian Schreiber, is a popular book on game design that is also a great example of the problem I see with these books. Much of the book is pretty basic introductory textbook-type stuff, and although it includes hands-on exercises (which are useful), the book slams on the brakes anytime it comes close to talking about design philosophy. For instance, there's a section titled "Narratology and Ludology." According to the authors, *ludology* is "the study of games as rules (or mechanics)" and *narratology* is "the study of games as a storytelling medium." This short section ends with the following statement:

These two divergent schools of thought are, for the most part, exactly that—thought. In the life of a workaday game designer, the topics are rarely discussed in black-and-white definitions as they are above. Rather, the designer usually focuses on what's not up to snuff in the game, whether it's something whacked with the balance or an untested story path he has yet to implement.

The authors end the section by saying that "the two schools are complimentary" without any explanation of how they are complimentary, and completely overlook all of the times that the schools are anything *but* complimentary. In my opinion this is an attempt to be as safe and conciliatory as possible, which ends up being a complete waste of text. Why bother writing down this standard-issue, status quo half-opinion? How is this chunk of text useful for anyone? What does "up to snuff" even *mean*?

Another well-known book on game design is Raph Koster's illustrated book, *A Theory of Fun for Game Design*. While this book does make

some solid points, he stops short of having a holistic, complete vision for what games are. For instance, he has a chart on one page showing numerous different human activities—all kinds of things, from “community” to “performance” to “criticism” to “teaching.” He then goes on to say this:

The classic definition of *game* covers only some of the boxes in the grid. Arguably, all of the boxes in the grid are fun to someone. We need to start thinking of games a little more broadly. Otherwise, we will be missing out on large chunks of their potential as a medium.

He is essentially saying that just because someone thinks something is fun (and “someone” can think *anything* is fun), we need to expand the definition of the word *game* (already extremely loose, if you ask me) to include whatever that activity is. This kind of talk moves us further from a solid understanding of what games are, not closer to it.

Other examples include Jesse Schell’s *The Art of Game Design: A Book of Lenses*, which has exactly 100 lenses, or questions, to ask yourself about your game design. First, what are the chances that there are exactly 100 good questions that need to be asked? (I propose that there should be a *rule of suspiciously round numbers* that tells us to doubt such lists.) Overall the book may end up having some use for game designers, but it’s definitely using a “spray and pray” approach, since it’s likely that only two or three of these questions will actually be useful. Again, it does *not* provide a holistic view of the nature of games and will only improve your understanding of them circumstantially.

For those who might defend these books by saying that they’re only giving readers wiggle room, or that they’re allowing readers to come to their own conclusions about what games are: *readers do not explicitly need to be given permission to do this*. Thinking persons will come to their own conclusions, regardless of whether they read something wishy-washy, or something pointed. One can make a strong point and still allow disagreements and other ideas to exist.

The essential problem with game design theory now is that too many people are resistant to any solution that may be a little bit *destructive*. “If a solution means I have to throw the gameplay of *Final Fantasy VII* into question, then forget it!” might be one reaction. Language and culture may also be impediments to change: the meaning of the word *game* is very broad and very loaded culturally. We may need terms that are more specific than those that are currently available if we are ever to get a clearer understanding of the different types of interactive systems.

What This Book Is



This book is a walk-through of my philosophy on game design. It offers a radical yet reasoned way of thinking about games, and a holistic solution to understanding the difference between games and other types of interactive systems. I argue that the method offered in this book is *the* path that game design must take to improve.

I propose definitions, concepts, and methods that together form a philosophy of game design. This book aims to add this philosophy to the ongoing discussion in a bold and clear way. Even if you completely disagree with what you read here, you will certainly come away with a stronger understanding of the field and a more distinct philosophy of your own, which will make you a better game designer. After laying out the fundamental concepts of my philosophy, we'll use it as a lens to analyze the history of games and modern trends.

This is a book for people who, like me, wish to find the best way forward for games.

What This Book Is Not



Some of the game-design resources I've looked at go on at length about the cultural *meaning* of games in our society. They discuss the games industry, the state of gaming journalism, the role of race and gender in games, "gamification," and other topics loosely related to game design. General statements about the experience of players and the nature of play are also common. Almost all of them seem to downplay, minimize, or outright ignore the purely mechanical aspects of games, which I think is a serious problem that has affected games in a profoundly negative way.

As I've already made clear, this is not a hands-on, how-to book about game design or game development. It's not about how to sell more copies of your game, and it's not about how to work better with a team. Those things are absolutely useful to any commercial game designer, but they aren't so useful for people who just want to make a small game with pen and paper to play with their friends—let alone people who just want to design, and don't even want to play the games they create.

This is a book that will be useful to *all* game designers, because it is a book about game design at an abstract and fundamental level. It is specifically directed at video-game designers and players. As I said before, I think video games and the culture surrounding them are in a very unhealthy place right now, but at the same time video games have enjoyed incredible success over the last ten or fifteen years. Consequently, designers have even more responsibility for knowing what