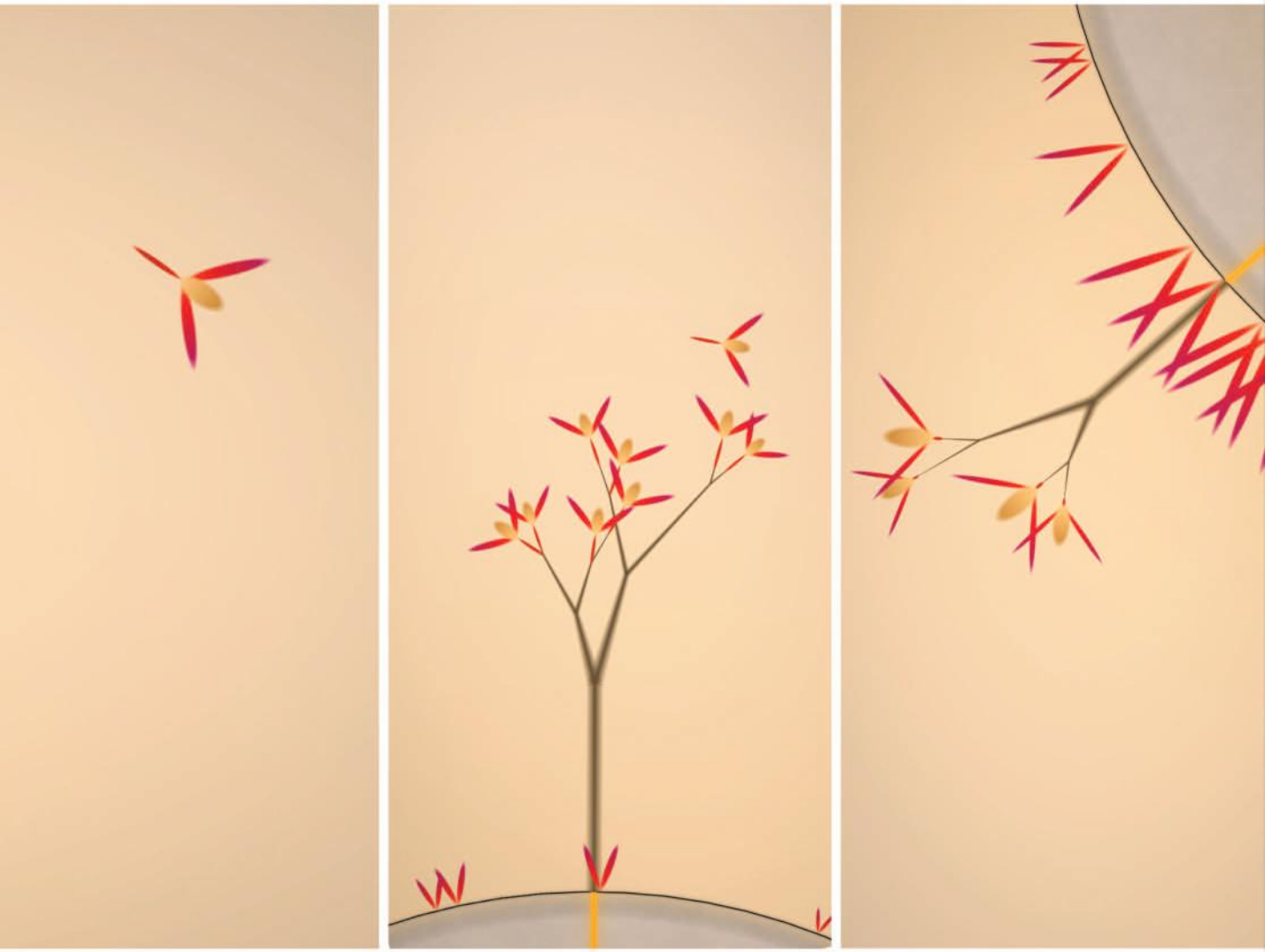
Level Design

CONCEPT, THEORY, & PRACTICE



Rudolf Kremers

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A K Peters, Ltd.
Natick, Massachusetts

Cover illustrations courtesy of Alex May

CRC Press
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

Version Date: 20150515

International Standard Book Number-13: 978-1-4398-7695-4 (eBook - PDF)

Visit the Taylor & Francis Web site at
http://www.taylorandfrancis.com

and the CRC Press Web site at
http://www.crcpress.com

For Kate

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Preface

> I hope that in finishing this tutorial you will be well on your way to creating worlds of your wildest dreams . . . or nightmares.[1]

As in many endeavors of this kind, much of this book comes from personal motivation and circumstances. I have tried to keep reference to those out of the main text but I would like to acknowledge them somewhere in the book. I guess that is why the preface was invented. Here, then, are some of the personal aspects of why and how this book came to be.

On Level Design

One of the many beautiful things about level design is that it is an almost all-encompassing field. There aren't many creative interests and expressions that cannot find a home in level design, yet it remains a unique profession with its own rules and quirks, and there are few jobs in games as satisfying or important as that of a level designer.

It is, however, a very young profession, and because of its youth, it is often misunderstood or misrepresented, which is regrettable. A good level designer can have as much impact as a good screenwriter or director, a great artist or musician. Those are vocations that people aspire to and recognize as being beneficial to society as a whole.

Video games have not yet come this far. Many people still look surprised to even hear video games mentioned in conjunction with other, more established art forms, although this is slowly changing. Perhaps one day this mistrust of video games as a medium that can compare to other art forms will be quaint and slightly amusing. Hopefully on that day this book will still be in print and the words you have just read will seem odd and out of place.

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[1] *Worldcraft 1.6 Tutorial*, available at http://hosted.planetquake.gamespy.com/worldcraft/tutorial/index.shtm, 1997.

Either way, regardless of being greeted with a cheer or a puzzled face, being able to work or have a career as a level designer should be something to be immensely proud of. I certainly am.

Why This Book?

Working as a game designer or level designer for a substantial amount of time has shown me there is a lack of understanding of how level design works at a fundamental level. There are many very basic questions that go unasked:

- What fundamental concepts matter to this field?
- How do they translate into level design theory?
- How do we translate theory into practice?

Level design is an incredibly exciting and important field. Good or bad level design can make or break any game, so it is surprising how little reference material there is available for level designers to give them a deeper understanding of what exactly their field is about. Level designers have a limited understanding of what tools and techniques they can use to achieve their goals, or even define them. This is perhaps, considering the youth of the profession, (15–20 years or so[2]) not entirely surprising.

This is, however, a completely different situation from comparable professions in other industries; there are countless sage-like tomes available on topics as diverse as direction, production, set design, camera work, acting, lighting, writing and so on. In those disciplines, in stark contrast to level design, an enormous amount of knowledge has been collected and made available to others. Even within the game industry, there is a large amount of high-quality literature and other material available to programmers and artists, but not so much for designers.

Therefore, most people who work in the field of *level design* either learn through apprenticeship on the job, or are self-taught. This is less than ideal because, due to the high-pressure work environment of the game industry, it is very difficult for people to take a step back and incorporate a more formalized approach to their profession. Nor, as mentioned already, is relevant knowledge and reference readily available. Instead, a lot of level design isn't actually *designed*. Often it is a derivative of other successful work, implemented without a full understanding of why the original work was successful. Other times it is just reactionary, quickly improvised to vague parameters, sometimes based on nothing more than some nebulous sense of "fun." This is not meant as a harsh criticism

[2] At the time of writing.

of other people; I certainly have done it many times myself. It is just a logical consequence of working in a creative field where there is not enough support at a core level for people who already have limited time and are under much pressure to perform. This is one of many reasons why I believe there is a great need for a book that provides strong conceptual foundations, formulates working theories and, crucially, shows how to apply these in practice.

After learning about my craft the hard way, like other level designers, through self-training on the job, I realized that most of the hard-earned lessons in our field stay isolated from other level designers. The people most likely to hold the right answers to difficult level design questions posed in practice are often too busy working on their next game, while people outside of games don't have enough exposure to the hard reality of commercial or practical game development. This is why I have set out to write a book that bridges this gap between theory and practice, useful to people on either side of the spectrum—a book that will still be relevant as a work of reference or as a practical guide many years after being published. I wanted to write a book that uses a conceptual and theoretical foundation to build a set of practical tools and techniques that can be universally applied within the field of level design. Or, to put it more simply, I have tried to write the book that wasn't available to me when I first started as a level designer.

Hopefully it will fill that role for some of the readers.

Thanks and Dedications

While writing this book, I have gone through a number of events that have affected me in one way or another. I bought a house with my partner, sat through two earthquakes (yes, *two*), added two rescue dogs to our menagerie, started my own business making independent games and became a full-fledged vegetarian.

All of the above provided major distractions, as you can imagine; yet, in all that time, I was lucky enough to receive the love and unwavering support of my wonderful partner, Kate, without whom I would have been lost several times over. This book is therefore firmly dedicated to her.

Additional thanks go to my publisher, A K Peters, and the people there that have helped me get the book into a readable state: Alice and Charlotte, especially. And boy did I need the help!

I have also been lucky to receive the support of family and friends and all the people who have helped me with proofreading and advice all throughout the project. Thank you all very much! Special thanks go to Alex May for his work on Dyson. Extra special thanks go to Colin and Diana for their unfaltering support and belief in me.

I must also mention Neemo the courageous dog, Tom the wonder dog, and Billy the naughtypuss.

Finally, thanks to all the people who create the levels that inspire me every day.

Introduction

Make things as simple as possible, but not simpler.

—Albert Einstein

This book is a hefty affair; there are many ideas, concepts theories, practical examples, tangents, and footnotes to read. I have done my best to present it in a way that makes sense to most readers. But, to really get the most of the book, I give you this introduction that explains how it all hangs together.

How to Use This Book

Ultimately it is up to you, the reader, to use this book in any way you see fit. However, the book has been written within a certain logical structure and flow that made sense to me while writing it. Wherever possible I have tried to introduce concepts and theories before I start showing their practical applications. This not only applies to the later chapters that are actually divided into concept, theory, and practice sections but also applies to much of the preceding content. A good example of this is the chapter on "Teaching Mechanisms" (Chapter 2), which explores ideas that are so fundamental to what level design is about that it made sense to cover it early on. I do advise people to read this chapter before the following ones.

This kind of hierarchy is applied throughout the bulk of the book—where understanding of certain ideas paves the way to understanding of others. Since later sections often refer to earlier ones, the book may be harder to use if read out of sequence, though I have tried to facilitate this by referring to related material in later chapter when I thought it appropriate. Nonetheless, there is plenty of material in the book that can be read in its own right. Indeed, it is almost impossible within the framework of such a wide field to adhere to strict linearity.

It is my hope that I have made a book that is useful to people with a general interest in the subject of games as well as to people with a more specific interest in level design.

Who Is This Book For?

Although this book can be read (and hopefully understood) by anybody who picks up a copy out of curiosity, I would like to highlight some potential readers who may be more interested than others.

Level Designers

Naturally, it is important that this book is useful to level designers. The book is written in such a way that it should prove useful to both inexperienced and veteran designers alike. I made a conscious choice to mainly focus on level *design* as opposed to level *construction*.[1] It is important to make that distinction, as level design is a universal field, whereas level construction is *technology dependent*. Too often have I come across texts that claim to be about level design but read more like a technical instruction manual for some 3D software application. This is only a useful approach for those people who will be using the same technology as the author of that text.

Instead, I have done my best to make the book as much about level design as possible, ignoring platform- or technology- or level-construction-specific issues. The book is based on the assumption that *design* knowledge has to come first. The way in which vertices are manipulated in a 3D mesh or how entities are placed in a level editor is so dependent on unpredictable technical factors that they are best tackled outside of the context of this book.

What this book *will* do, however, is cover material that teaches and informs level designers of all levels of expertise *what* to aim for in their designs, *why* they should do so, and *how* to achieve those goals in as many diverse situations as possible.

Students and Teachers

Similarly, the book is aimed at *future* level designers and their teachers. There should be much useful content for students and teachers to work with. Due to the fact that there are no insurmountable technical barriers barring readers from engaging with the text, it is ideal for general academic use.

There is a large amount of theory and high-level conceptual content to be found in this book. Much of it is supported by information derived from other fields of interest.

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[1] Or production.

Nonetheless, this still only scratches the surface of the vast amount of knowledge that is relevant to level design. The book, therefore, could be used as a stand-alone text as well as a base for even more detailed course material.

The practical[2] aspect of the book provides an invaluable tool for assessing the progress made within a course. Since the material covered always has a final practical application, it is always possible to test the knowledge acquired against the harsh realities of real-world level design scenarios. This provides scope for benchmarking as well as the added advantage of providing real training and preparation for actual industry work.

Other Interested Parties

There are, of course, many other reasons why somebody could be interested in the field of level design. Just as I have throughout the book found inspiration and knowledge applicable to level design through the study of other creative disciplines, the same can be imagined of people in other disciplines in regards to level design. A certain amount of cross-pollination between art forms is to be expected and encouraged.

Furthermore, the book can be enjoyed on a non-professional level. Anybody who has an interest in level design or video games should find more than enough to keep them occupied for quite a while. Due to the fact that level design is such a wide-ranging discipline, it can easily spark off or feed other existing interests as well. Indeed, many of the chapters can function as short introductions and springboards to entire fields of related knowledge. This is one of the beautiful things about level design in general, and hopefully this multi-connected aspect will speak to people reading about it. It still does to me.

Organization

Whichever way you choose to read the book, it may be useful to understand the way the book has been structured. For this purpose a short summary of the chapters and parts of the book follows.

The main body of the book is organized into parts, then chapters, and then sections. Parts are thematically related: they handle areas of interest that can be seen through the filter of a general theme. The chapters handle more distinct areas of interest and cover specific subjects. The sections break the subjects down into three important aspects: concept, theory, and practice.

[2] The sections dealing with level design *practice* especially.

Part I: Introduction to Level Design

Before we can even begin to look at either high-level concepts or more practical aspects, we have to understand at a basic level exactly what it is that we are doing.

These chapters are about level design itself. It covers the nature of the beast all the way from examining its function within the field of game design to explaining what level design *is*—and, more importantly, what *good* level design is.

Furthermore, the text goes into a fair amount of detail regarding methodology and structure. This section of the book is fundamental to understanding the point of level design and the ability to define sensible goals and tasks springing from that knowledge. The section provides, among other things, much interesting information about the psychology of *play*, without which it is difficult to really grasp the impact of the techniques at our disposal. It also gives a first example of the concept-theory-practice breakdown used more extensively in later parts of the book.

Part II: Emotional Feedback Systems

This part of the book examines how game levels work as feedback systems. That is to say that game levels can provide players with emotional feedback—fun, tension, immersion and so on—based on their actions within the game world.

Part III: Game Environments

Part III looks at some of the senses through which we experience levels as game environments. Specifically, the visual and audio aspects of level design are studied in a fair amount of detail.

Part IV: Game Stories

Narrative and story are very controversial subjects within the framework of game studies. Yet, there is no escaping the fact that level designers have to deal with the subject on a regular basis and will be better able to do their work if they have an informed opinion or understanding of what factors are at play. I decided that due to the somewhat specific focus of the subject, it should be covered in a separate part of the book.

Part V: Designing Gameplay

This is a central part of the text, where many of the diverse parts about actually *designing* levels come together. Or, to paraphrase one famous level designer, Jay Wilbur; this is "*where the rubber hits the road*."

Many of the bread and butter issues of level design like puzzles, challenge levels, or item placement are examined in detail.

Part VI: Final Thoughts

In this final part of the book, matters are wrapped up by a taking a look at what may lie in the future of level design. There is also a small list of recommended material, reading or otherwise, that may be of interest to those readers who want to study more on the subject in the future, as well as a glossary and the book's index.

Notes on Concept, Theory, and Practice Sections

A large portion of the text is presented in chapters that each, in a fairly linear manner, cover a topic by addressing a basic *concept*, incorporating it in level design *theory*, and finally apply it in *practice* through examples and case studies. This structure—where *concept* leads to *theory* leads to *practice*—is the only way I could conceive to collate this much diverse information in one coherent text.

Concept

In these sections I will identify a large number of concepts, by which I mean any topics and areas of interest *related to* fundamental elements of level design. These are topics that anybody involved in level design will encounter at one point or another and are worth exploring. The *concept* section of a chapter presents the reader with a short essay or exploration that examines a specific topic that in some way matters to level design. These essays will mainly deal with high-level principles and ideas that take inspiration from sources as diverse as general psychology, language studies, other art forms like film or literature, or anything else that is relevant to the topic.

Through examination and analysis that goes beyond the limited framework of video games, the concept section will lead to a number of *general findings*.

Theory

The *theory* sections will take the general findings from the previous section and show what relevance they have when they are applied directly to the field of level

design. It will show that, through this process and through general extrapolation, it is possible to arrive at a number of logical conclusions that can be useful and relevant to specific level design theory.

These sections will demonstrate that these theories can be applied to all kinds of different level design situations, largely irrespective of genre. In other words, they are fundamental to level design.

Practice

Finally, in the *practice* sections of the book, the level design *theory* of the previous section will get exposed to real-world *practical examples*. At this stage the subject matter becomes one of practical application and will be much more specific than before.

These sections will document numerous examples of typical level design situations or scenarios and show how they benefit from the conclusions of the previous sections. By using a wide and diverse range of examples, they will show how useful it is to be able to apply universal techniques and theories to real-world level design situations.

I will give practical examples on many level design situations, some of which will be drawn from existing levels, sometimes my own work, or will be completely new scenarios. We will look at examples from as many diverse genres as possible, including puzzle games, 3D action adventures, first-person shooters, 2D platform games, and many more.

The key point is that by using the lessons learned in the *concept* and *theory* parts of the books, it is possible to apply solutions to level design questions in almost any game genre or situation.

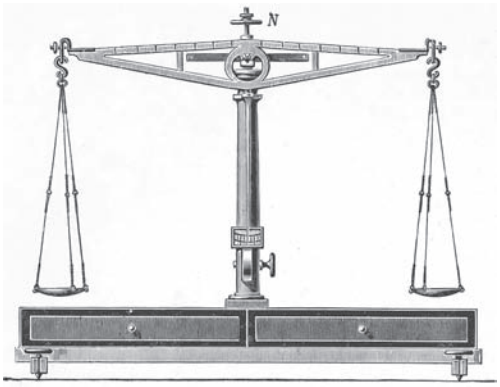
Goals

Finally, I would like to explain something about my general philosophy on books like this one. I do not expect the reader to agree with all my assertions and opinion in this book. I think it is futile to even try to do this, especially in a field like level design where there is still so little consensus in some of the key areas of interest.

What I am trying to offer instead is a book that gives the reader a number of useful tools to work with. This includes tools for examining the subject itself, tools to form or study theories, and tools for applying knowledge in practical and tangible situations. I firmly believe that an informative approach, rather than a dogmatic one, works best.

Within that spirit I hope that the reader will find it a useful and empowering work, and that it will open doors or avenues that may have been left unexplored otherwise.Giamcon henim do ex ecte facin volum vulputatum iriurer aesendi

Introduction to Level Design



"Gleicharmige Waage", *Wikipedia*, http://commons.wikimedia.org/wiki/File:Gleicharmige_Waage.png, 2009.

Game Design vs. Level Design

It is often asserted that level design is a *subset* of game design. This is mirrored in the game industry, where, at the time of writing this book, level design does not have the same status as game design, and often, level designers have to aspire to game design roles to progress in their career. The pay grades within the industry enforce this bias, as well; a game designer will typically earn more money than a level designer. This situation is very unfortunate and based on a number of misunderstandings or misconceptions. Among these are that game design "trumps" level design, or that level design work is somehow subordinate to, or simpler than, game design. This assertion misses an important aspect of level design: it should not be underestimated how much of an impact level design has on a game. It is a well-known truism that:

> Bad level design can ruin a good game.

If this is true (it is), the impact of a game's level design is as strong as that of the game design. Conversely, we can therefore say:

> A bad game cannot be saved by good level design.[1]

The two statements seem to put level design and game design on somewhat equal footing, at least in terms of impact on the development of the game itself. It is clear that game design and level design are not the same discipline. However, they clearly cannot exist without each other. There is an interrelationship at work that operates on a deep and fundamental level. It is useful to try to find a way to interpret both fields and show how they are interconnected and what sort of relationship they form. To make this possible, we must have a look at the basic function that both fields perform.

[1] Although it can be argued that good level design can make a mediocre game enjoyable.

The Function of Game Design

There are many differing interpretations of what game design actually is; some are derived from detailed academic studies, while others come from experienced game designers who have gained their knowledge through practical application. The sheer amount of differing definitions almost inevitably leads to as many disagreements and arguments, although many disagreements seem to arise as much out of semantic differences as out of interpretive ones. The various game design definitions can arise from origins including ideology, commercial function, or practical analysis.

Because of this lack of consensus, and because of the sheer number of proposed definitions, there is currently no easily identifiable unifying concept of what constitutes *gameplay,* let alone *game design*. There are many sizeable books and academic studies devoted to games and gameplay but they often contradict each other and in some cases even attack each other. This presents a problem, since game design and level design are interrelated, and we need to agree upon a certain amount of theoretical common ground to formulate workable universal (or at least wide ranging) theories and techniques. So despite the lack of a universally accepted view on games and gameplay, we should nonetheless examine the diversity of opinion more closely. Even if no definitive consensus can be agreed upon by *everybody* in the field, we should still aim to find commonalities and individual defining features that can be used for the purpose of this book. Perhaps by looking at all the differing ideas on what constitutes a game or gameplay, we can derive a useful set of descriptions that can be used to characterize the *function* of game design.

Definitions

One of the most famous definitions of game design is the one from Sid Meier that states that:

> A game is a series of interesting choices.

Further explanation of "interesting" often includes the following qualifiers:

- No choice should be consistently better than the others. (Or it would make the other choices uninteresting or redundant.)
- The choices shouldn't be the same. (It becomes meaningless to differentiate between choices.)
- Choices must be informed. (Lest they become arbitrary or random.)

On the surface, this rings true. People are easily engaged in gameplay when they are mentally challenged in an interesting way, especially if this is done in such a

way that the player stays engaged. Chess, for example, keeps the player engaged by the multitude of options available, made interesting by the far-reaching strategic and tactical consequences within the game. Unfortunately, this description of a game or gameplay is not all-encompassing; it simply doesn't always apply, something that I am sure Sid Meier himself would agree with.

Jesper Juul offers this:

> But some games do away with interesting choices altogether. The object of the music/rhythm games Dance Dance Revolution and Vib-Ribbon is simply to hit the right buttons on the PlayStation controller or dance mat at the correct time. These games do in fact not contain any interesting choices whatsoever - but performing the non-interesting choices is marked by some other form of enjoyment, namely that of being in time with the music. They are still enjoyable games, which goes to prove that interesting choices is not all there is to it.[2]

Unfortunately, within the field of game design, both in a practical professional sense, as well as within the academic realm, there is no clear consensus on the nature of game design, partially because it is hard enough to find agreement on what it is that constitutes a *game*! To illustrate this point further, when I started to research game definitions for this book in the hope to shed some light on the topic, I found, much to my irritation, that I couldn't find much overlap between differing viewpoints. Instead, many views were contradictory, even when they tried to incorporate as many "accepted" elements as possible. Several people who have spent more time than me trying to define games have commented on this.

Katie Salen and Eric Zimmerman, in their book "Rules of Play," formally compared eight notable definitions or descriptions of games and put the defining characteristics in a comparative grid. This is one of their conclusions:

> All of the authors except Costikyan include rules as a key component. *Beyond this there is no clear consensus.*[3] Although 10 of the 15 elements are shared by more than one author, apart from rules and goals, there is no majority agreement on any one of them. (*Emphasis mine.*)[4]

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[2] Jesper Juul, "Just What Is It That Makes Computer Games So Different, So Appealing?" *IGDA The Ivory Tower*, April 2003, available at http://www.igda.org/columns/ivorytower/ivory_Apr03.php.

[3] Nonetheless, the authors then proceed to create a definition of games that is easy to disagree with.

[4] Katie Salen and Eric Zimmerman, *Rules of Play: Game Design Fundamentals*, MIT Press, Cambridge, MA, 2004, p. 93.

Perhaps a definition of games is too much to ask for, as it is clear that it cannot be unambiguously captured within a single concept. The same is true for the concept of *play*, which is very much related, of course. It is, however, a topic that is unsurprisingly, discussed as fiercely as that of game definition. Unsurprisingly, because gameplay is the logical consequence of a game, and therefore they seem to be aspects of the same thing, leading to the same disagreements. Isn't it fair to say that games cannot exist without gameplay? It is clear that play is central to the experience. But is it the defining element? It is, according to some game researchers who argue that exact point. But what of other elements often represented within games? For example, what of the narrative elements present in many game types? Once again, disagreements or lack of consensus come to the fore.

Ludologist vs. narrativist perspectives

As much as is the case of practical game development or commercial game funding, some disagreements within academic circles are quite profound. A good example of this can be found in the differing viewpoints often attributed to the *ludologists* and the *narrativists*.[5] Theirs is a disagreement that stems from a different interpretation of what games are, and within which context to place the play experience, a disagreement that has led to many articles and books, impassioned speeches, and even heated arguments. Although their defining features are often contested, they seem to be most clearly understood as follows.

Ludology is: A branch of game studies that approaches the subject through the prism of *play*.

While narrativism is: A branch of game studies that approach the subject through the prism of *narrative*.

This sounds straightforward enough, yet it has led to many, sometimes ill-tempered disputes. Let's look at the opinion of Michael Mateas,[6] who offers the following on narrativism:

> The narrativists generally come out of literary theory, take hypertext as the paradigmatic interactive form, and use narrative and literary theory as the foundation upon which to build a theory of interactive media.

And on ludologists:

> Ludologists generally come out of game studies [e.g., Avedon and Sutton-Smith 1971], take the computer game as the paradigmatic

[5] Narrativism is also often referred to as *narratologism*.

[6] A scholar active in the field of artificial intelligence, among other things, and one of the authors of *Façade*, an experimental interactive drama (*Façade* can be downloaded here: http://www.interactivestory.net/).

> interactive form, and seek to build an autonomous theory of interactivity.[7]

In some instances, ludologists have placed themselves in direct opposition to narrativist thinking, and vice versa. Differences between ludologist and narrativist thinking have produced so much friction that some even started attacking each other's viewpoints in public. (I am not going to go into specific examples, but things got quite heated.)

Ultimately, in the eyes of many, neither view is correct, or rather, they are both right and wrong at the same time, insofar as they both focus on legitimate aspects of the equation but try to invalidate other equally appropriate ones. (I am old and wise enough, however, to leave this debate to those willing to spend their time on it.)

Far from being the only positions available, the narrativist vs. ludologist standpoints illustrate how deeply entrenched people can become in their very particular beliefs about games and gameplay. It is notable that in many ways, both parties to some degree perpetuate a false dichotomy. Most narrativists, for example, don't deny the relevance of play, just the weight and importance given to it by some ludologists. We can still agree that play is fundamental to games, while also acknowledging the importance of narrative within a gaming experience. Narrative, however, will be discussed in detail in its own section of the book: Part IV, Chapter 12.

To be fair, much of this debate is suspect insofar as that often, when pressed, it seems there is only limited disagreement, which often stems from methodological issues more than from anything else.

Gonzalo Frasca states in the abstract of one of his articles:

> During the last few years, a debate took place within the game scholars' community. A debate that, it seems, opposed two groups: ludologists and narratologists. Ludologists are supposed to focus on game mechanics and reject any room in the field for analyzing games as narrative, while narratologists argue that games are closely connected to stories. This article aims at showing that this description of the participants is erroneous. What is more, this debate as presented never really took place because it was cluttered with a series of misunderstandings and misconceptions that need to be clarified if we want to seriously discuss the role of narrative in video games.[8]

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[7] Michael Mateas, "Michael Mateas Responds in Turn." *Electronic Book Review*, http://www.electronicbookreview.com/thread/firstperson/bestyled, 2004.

[8] Gonzalo Frasca, "Ludologists Love Stories, Too: Notes from a Debate That Never Took Place," *Ludology.org*, http://ludology.org/articles/Frasca_LevelUp2003.pdf, 2003.

Even though the dust has now settled a bit, it is worth reflecting on how difficult matters of definition can be, and game-related definitions are notoriously hard, by any standard.

External Goals

Since we are looking at matters of *function* and *purpose*, we should look at game design's external goals. If we know what game design is supposed to *achieve*, we have a much better idea of game design function. External goals are as fundamental as describing what something is *for*, and *how* this is achieved. Let's take a real world example: a *chair's* design, and use it as a simple test case.

A chair's design is subject to many requirements, but the main identifiable goal is to allow a person to sit on it. An observation that may be banal in its simplicity, but one that needs to be noted, nonetheless.

This basic goal leads to other related requirements that describe what the chair has to be:

- strong enough to take the weight of most people,
- stable,
- affordable,
- moveable,
- aesthetically pleasing.

At this point, a designer comes in and starts to formulate these external goals and requirements in a number of functional designs. Regardless of the content of those designs, the design's *function* or purpose is partly described by these external rules.

The same principle occurs in game design. The basic function of a game determines the *game design*'s function. So a first step in game design is to correctly identify the game's external goals and to interpret those in such a way that they get represented well in the game's rules.

This means, for example, that a game whose defining external goals are of a commercial nature will end up radically different from a game whose external goals are centered on delivering, for example, a disturbing artistic narrative.

If we decide that the main defining external goals are simply aimed at gameplay and profit, and if we apply the chair analogy to a game, we could state that the game exists in order to *provide a fun and profitable gameplay experience*.

This then leads to other related requirements that describe what the game has to be:

- pretty,
- easy to learn,

- hard to master,
- of sufficient quality,
- showcase high production values,

and so on.

It is important, however, not to confuse these with the game's internal or intrinsic goals.

Gameplay Goals

It has been noted earlier that a defining feature of most games is that they have goals. These are the level design or general gameplay objectives that the game itself presents to the user. We encounter these all the time, and it is easy to name typical examples. Take the following list of player objectives:

- Attain the high score.
- Unlock the dungeon.
- Defeat the boss character.
- Win the race.
- Score more goals than your opponent.
- Explore the environment.
- Shoot the enemy soldiers.

Most gameplay is driven by these kinds of explicit objectives and motivations for the player, a fact that is hardly controversial. To the level designer, however these goals must be *designed*. And in order for them to be designed, they need to have a logical source or reason to be included in the levels. This reason is generally found in the game's internal or intrinsic goals.

Internal goals

These are similar to a game's external goals, insofar as they describe high level goals from which we can derive gameplay requirements. The difference with external goals lies in the fact that internal goals govern the high level goals that are directly related to aspects of the game and gameplay itself, as opposed to external factors. They tend to cover things like the following:

- Empower the player.
- Teach the player how to have fun with the game.
- Don't break the player's suspension of disbelief.
- Give the player a sense of achievement.
- Reward the player for exploration.
- Provide addictive, fun gameplay.

We will look in more detail at these kinds of goals and how they fit in a development and level design hierarchy in Chapter 3.

Defining Goals and Designing Rules

What all this tells us is that both internal and external goals are part of game design *function*. It describes functional necessity related to gameplay AND related to the game's more existential[9] goals, like turning a profit or making a particular artistic statement.[10] Goals like these are useless by themselves unless they get translated into actions. How do we achieve these goals? In the case of game design, this means that once the external or *meta* goals have been defined, the designer needs to design the actual game, which means designing the game's *rules* in such a way that they best support the external goals.

Rules

A fundamental aspect shared by most, although not all, video games, is that they adhere to a formal set of rules. Games without rules can exist, but they are either very abstract in form, or function more on the level of toys. Nonetheless, it cannot be denied that by far the majority of all games, not just video games, are based on or reliant on a *formal set of rules*, often predetermined, that the player has to follow in order to successfully play the game.

Some people go even further and argue that games cannot exist without rules:

> Rules are what differentiate games from other kinds of play. Probably the most basic definition of a game is that it is organized play, that is to say rule-based. If you don't have rules you have free play, not a game. Why are rules so important to games? Rules impose limits—they force us to take specific paths to reach goals and ensure that all players take the same paths. They put us inside the game world by letting us know what is in and out of bounds.[11]

However, this construction of formal game rules is completely abstract until executed in *play*. This is similar to theater, where the actual *play* does not exist until the *performance* takes place. The text of the play can be read in its own right, of

[9] Suggestions for a less pompous term are welcome.

[10] Chapter 3, "Level Design Goals and Hierarchies," will cover these subjects in much more detail, focusing both on external and internal goals and how they relate to level design.

[11] Marc Prensky, *Digital Game-Based Learning*, McGraw-Hill, New York, 2001, p. 14.

course, but the actual *theatrical play* only takes place during the performance. The same is true for games. Although a game's design may be able to formalize the rules of the game, until actual play occurs, this design is unfulfilled, and in many ways the game itself is *incomplete*. Game design facilitates play by designing rules under which play can *occur.*[12]

A quick word on toys

Toys are often excluded from definitions of games because they don't have a set of formalized rules associated with them. This is true to a degree but is somewhat misleading. It is more accurate to say that toys don't have a set of *predetermined rules* associated with them. This does not stop those who play with toys from formulating their own rules spontaneously at the time of play. The end result is the same as in other games: the player is actively engaged in gameplay. The newly formalized rules may be simple, for example a game of catch between two, such as parent and child, but they are gameplay rules nonetheless.

The conclusion that follows from this is that toys are *facilitators of games that ask players to define their own rule set.* Crucially, the player(s) temporarily take on the guise of game designer and level designer.

Game Design Function Summary

It appears to be difficult to agree on a definitive view on what games are. There are countless definitions of games and their associated viewpoints, and they often are in disagreement with each other. But study of games, gameplay, and game rules shows that there are a number of commonalities that can be highlighted:

- Play is central to games.
- Diverse and unrelated goals can motivate the production of games.
- Most games rely on rules, or facilitate the definition of them.

If seen in this light, we can describe a game as featuring: *an often predetermined, agreed-upon set of rules, which are designed to facilitate gameplay. The motivation behind the creation of a game itself can be diverse, for example including commercial, educational, artistic, or other elements.*

All of these elements are individually fairly obvious; yet taken as a whole, they spell out something fairly useful with regards to finding a workable concept of the function of game design. Within all of these observations lies an answer to the question about game design's *function* or *purpose,* because they describe what a designer needs to *achieve*.

[12] It is also good to note that just *facilitating* play is not enough to guarantee a *good* game.

Ultimately, a game designer is the person who determines the rules by which a game is formulated, in order to achieve the goals for which it is created. And in some ways, a *good* game designer is one who is good at determining what rules are appropriate for the desired gameplay.

A game design is a coherent set of rules that formalizes a game's content in such a way that it facilitates appropriate gameplay, in order to achieve the game's fundamental goals.

The Function of Level Design

Now that we have spent considerable time looking at game design function, we need to compare this with *level design function*. We have seen that in game design it is very important to define what the game's external goals are and design rules of play that correctly support them. Questions about level design in many ways seem to start from a completely opposite position. The rules of play are a *known*. How else can we construct a level if we don't already know what rules it has to facilitate?[13]

On closer inspection, however, we are left with a similar definitional problem as we had at the beginning of this chapter with regard to game design. Where *does* the rubber hit the road? How do we define this? Instead of trying to find an ultimate definition of level design, I would like to focus, just as we did with game design, on finding a useful description of the *function* of level design. The reason for trying to formulate an overall function or purpose for level design is that it should give us a way to determine what is within the level designer's responsibilities. This will give us more than a job description; it gives us a conceptual framework within which we can do our work. This is something that may sound unimportant on paper, but is nonetheless of vital importance in practice when we need to defend or explain our professional or artistic choices. (Even in those cases when we have to justify them to ourselves.) Or to put it in less dramatic terms; it gives us a practical framework through which we can approach level design.

A useful start to this endeavor is to look at level design in a historic context.

Level Design in a Historic Context

It is beyond the scope of this book to provide a complete history of level design, although it would be a fascinating project to attempt to do so. Instead, a short

[13] Scarily, in commercial level design, one is often asked to design levels without a clear understanding of the final gameplay parameters.

look at a number of historically interesting examples of level design or related fields will have to do.[14] Even this limited focus should produce some insights, as there is much to be learned. At the least, it should provide us with some historic context in which we can place level design.

Sports

Almost all sports take place within defined spaces. And, more importantly, most sports take place in *designed* spaces. At some point in time, somebody actually decided on the dimensions of a soccer field, the size of a hockey goal, or the placement of hurdles in an equestrian[15] course. How these original decisions by proto-level designers were made we don't always know, but it is clear that they allow for an important function of sports: competition. In order to compete under fair terms, their design allows a level *playing field*. (A term that sounds much like a video game *level* to me.) A sporting field or environment usually cannot be altered or bypassed by the participants of the sport. It is literally *against the rules*, and the offender typically gets punished heavily or even disqualified from participating further.

Board-game layouts

Board-game design is even closer to level design for video games, partly because it allows the creation of an *abstract representation* of an environment. There is not always a need to create a field of even grassland with play zones demarcated by chalk lines, or to run divisions of soldiers through complex tactics and strategy drills out in some field, if a similar effect can be created by an approximation or an abstraction in the form of a board game. Chess, for example, is a good case; the game portrays warfare and enhances strategic thinking, despite using a playing area that is rather abstract.

Furthermore, board games provide scope to introduce elements of the fantastic into play. In the context of a board game, it is fine to teleport players through the world, or to introduce mythical monsters as adversaries. A board game can introduce elements of chance (pick a card) and encourage the use of avatars.[16] Many of these choices are affected by the board's layout, which had to be *designed* at one point in time. Literally thousands of board games have been designed through the years, and the inherent level design choices that were made provide a rich source of information. They are especially interesting from a historic point of view, because they go back many hundreds of years.

[14] I do encourage people to do some of their own research in this area.

[15] Am I the only person who thinks of a platform game when these horses jump?

[16] A game piece that represents the player.

A good exercise for budding level designers would be to choose any board game, try to find out why the board was designed the way it was, and try to improve on its design. This is a guaranteed way to improve as a level designer[17] and as a byproduct is likely to teach some appreciation of board game designers, as well.

Pinball machines

Another beautiful example of proto-level design can be found in pinball games. The basic rules of pinball games can be summed up on the back of a napkin. As a set of rules describing a game, there really isn't much to it. Yet many hundreds of iterations of such games have successfully persuaded players all over the world to feed them coins. There are a huge number of pinball tables whose layout and content design, or in other words, their *level design*, showcases new and successful interpretations of those old and basic rules. The player still controls flippers, the table is still slanted so the ball rolls down, and the game offers three "lives" to earn a maximum amount of points.

Yet there is no shortage of unique and wildly differing pinball tables. Together, they provide an interesting and enduring example of an *interactive* game type that predates video games.

Dungeons and Dragons

In 1974, Gary Gygax and Dave Arneson designed a new type of game still enjoyed proudly by the geek tribes of the world. They created one of the first successful pen-and-paper roleplaying games and called it *Dungeons and Dragons*. The basic setup of the game consists of a group of players sitting around a table and enacting the roles of diverse *player characters* within a virtual *fantasy setting*, designed and described by the *dungeon master*. The dungeon master literally describes this virtual world to the other players in such a way that the players can imagine themselves to be there in their own imagination. The dungeon master tells the players what they encounter within this world, and the players describe their actions and reactions to the dungeon master, role-playing (play acting) their player characters. The physics and mechanics of this world are documented in complex and extensive rule books sold by the publisher, the adventures (modules) that the players experience within this virtual setting are designed beforehand, either by the dungeon master or by an independent designer. A skilled dungeon master can take the somewhat impersonal, systematic rules on how the world and its inhabitants or processes behave, and through the use of a well

[17] Game designers should try creating better rules or even design the board games themselves.

designed adventure, really bring it to life, providing the other players with an extremely compelling play experience.

Key to this, though, is the earlier prepared adventure, which functions as a perfect example of a level design outside of video games. The dungeon master or independent designer takes on the role of level designer because he or she ends designing the in-game encounters and dramatic occurrences that define the player reactions in the game. Although often maligned as an activity, *Dungeons and Dragons* pioneered a fascinating new way of playing deeply immersive games. This was borne out by the huge number of players who since have bought the games and associated products, the countless other similar games that have since become successful, and the countless tie-in products sold. But ultimately for the purpose of this book, this provides an interesting example of alternative level design.

Lessons from history

What these historic examples show us is that level design is not exclusive to video games, but instead can be found throughout very diverse other types of games. Level design never exists purely on its own terms. But what the above examples have shown is that most game designs also don't exist within a vacuum; instead, they can only work together, in unison. This so far shows us that there is indeed a very close link between game design and level design, but it does not explicitly tell us what level design's main function is.

Unfortunately, due to the very young age of level design as a profession, there is not much recourse to be found in professional literature. Hardly any serious texts exist on the subject, and many of those are relatively old or cover the mechanics of level production more than anything else. Even so, some opinions and views have been expressed in the past that provide unique insights.

Various Views on Level Design

Throughout the limited history of level design as a unique discipline, various people have tried to describe or define the field, often based on nothing but their own hard-won professional experience. These definitions are fascinating in many ways. It is always wise to heed the words of pioneers in any creative genre, as typically these early works were the result of completely original thought processes led by novel problems, and not led by existing conventions or styles. And especially since many of these early designers have demonstrated their skills and abilities by providing high-quality examples of their craft. Let's take a look at a number of notable examples.

Example 1: Jay Wilbur

> Level design is where the rubber hits the road.[18]

Much of level design is about making sure the player is taught[19] the rules of play. An important part of the act of level design is taking all the diverse game elements, teaching the player the associated rules, and using the means available to put them together into one coherent whole. This is what Jay Wilbur meant by his quotation. The game design at one point has to be put into practice, and to do so, the level designer needs to be able to put all the diverse elements of a game together in such a way that it doesn't fall apart when tested in the real world.

Example 2: Sam Sharami

> Level designers, or map designers, are the individuals responsible for constructing the game spaces in which the player competes. As such, the level designer is largely responsible for the implementation of the game play in a title.[20]

This is an interesting view of level design insofar as it talks about its goals and the level designer's responsibility. It touches upon the important fact that level design is responsible for gameplay implementation.

Example: John Romero

> A level designer has a very responsible position, because maps are where the game takes place.[21]

Again, this is an interesting observation because it makes a comment on what maps (levels) are. If they are "where the game takes place," it follows that levels allow the game to exist, or at least to be played. An obvious point perhaps, but it tells us something about the strong link between game and game levels.

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[18] Jay Wilbur in conversation with Cliff Bleszinski, as reported in *Game Design: Secrets of the Sages*, MacMillan, New York, 1999, Ch. 6. Wilbur is a very famous designer who worked on titles like *Doom* and *Quake*, or more recently, *Gears of War*.

[19] See also Chapter 2, which discusses level design as a "teaching mechanic."

[20] Sam Shahrani, "Educational Feature: A History and Analysis of Level Design in 3D Computer Games—Pt. 1," *Gamasutra - Features*, http://www.gamasutra.com/view/feature/2674/educational_feature_a_history_and_.php, 1999.

[21] John Romero, notorious level designer, programmer, and game designer, who has been involved in many famous and even controversial games. In John Romero, "ION Storm," Chapter 6 of *Game Design: Secrets of the Sages*, Macmillan, New York, 1999; also available at *Gamasutra - Features*, http://www.gamasutra.com/features/19990723/levdesign_chapter_05.htm.

Summary of Views

We have heard that level design has to take all the disparate elements in a game and make them gel, that level designers are responsible for the implementation of the game, and that levels are where the game takes place. These observations, combined with what we have learned from historic examples of level design, provide us with something we can draw some initial conclusions from, and give us some guidance into what to examine next.

Level Design Function Summary

There seems to be no shortage of opinion and ideas on the topic of level design. It is disturbing, therefore, to note that, just as with game design, there is no clear underlying *theme* to these observations or definitions. This chapter has touched on a large number of diverse subjects, and throughout, we have reached a number of general conclusions. Many of these conclusions aren't individually that revelatory, but if taken together and placed in a shared context, they *do* provide useful results. Let's summarize and see where that takes us.

Codependency

It should be clear by now that level design and game design are not the same thing. It has also become clear that they are codependent and interrelated: one is useless without the other. Most games are unfulfilled without some kind of level design, while level design is an interpretation of a game's rules. Because of this codependency, it is very important to realize that we shouldn't study one without studying the other. To understand level design we have to understand game design. How can we interpret a game design without knowledge of it? And conversely, how can we define rules for an experience we do not understand?

Game and Level Design *Function*

This book is about level design, but if we take into account the findings of this chapter, this means that, at least to some degree, it is also about game design. If a game designer designs the gameplay *rules,* the level designer designs *how* the player is confronted with those rules. Looking at it from that angle, a level designer and a game designer have completely different jobs. A game designer *formulates* the game's rules, while a level designer *interprets* them for maximum results. To some degree, one represents theory while the other represents practice. This is the basic *function* of level design.

Play and Application of Game Rules

Just as a theatrical play needs a performance to be complete, a video game's rules need *gameplay* to occur. This is a basic *purpose* of level design, to interpret the game rules, and to translate them into a construct (a level) that best facilitates play. Another way of expressing this is by stating that "level design is applied game design." Not the most impressive definition of level design out there, but it is suitable for the needs of this book. It describes much of the function and purpose of level design, and therefore, much of the work of a level designer.

So, for the purpose of this book, level design will be defined as applied game design, not as a separate function subordinate in a game design hierarchy,[22] but as a description of its main function and purpose. This does not mean that I will focus overly on game design issues in this book to the exclusion of level design issues; far from it. Rather, it means that in order to understand certain level design issues, we have to understand certain game design issues. They are different sides of the same coin.

Area of Responsibility

These observations on level design's function or matters of definition are not unimportant or abstract. If we ourselves don't understand the nature of our work it will be impossible to confidently defend it. This isn't always achieved by the content we create, although that is obviously of the utmost importance. We need to be able to explain to others (as much as to explain to ourselves) why we made those choices in the first place. As often as not, we need to be able to make clear and defensible choices from the get-go; to do this; we need to know within what *area of responsibility* we work. It is helpful to be able to work from within a clear framework and to be able to say what the *function* of our work is and what areas it covers. This furthermore allows us to create clearly defined goals for ourselves, a theme that will be further explored in the imaginatively named Chapter 3, "Level Design Goals and Hierarchies."

[22] Is a written play superior to its theatrical performance?

Teaching Mechanisms 2

We have established in the previous chapter that: "level design is applied game design." This tells us something about the function of level design, but it does not give us enough information on the core content that a level designer needs to provide. This leaves important questions unanswered. What are the intrinsic internal workings of level design, as opposed to its external goals? *What is it that we are trying to do in the context of the game?*

We already know how closely game design and level design are intertwined. If we examine both at the point where they overlap the most, we start to take a look at fundaments of gameplay. In order to define the *nature of level design,* we will have to define the *nature of gameplay,* and how it relates to level design.

The following three sections provide a detailed examination of these matters. They also provide a preview of the methodology used later in this book, where a given subject is examined through chapters covering the subject's basic *concept*, how it applies to level design *theory*, and what applications it has in *practice*.

Concept

The Nature of Gameplay

Anybody who has spent any time around animals, perhaps a pet dog or a cat, knows that they are very *playful* creatures. It is very easy to start playing a game with them on the basis of rules that are surprisingly easily understood.

- Catch the ball.
- Retrieve the stick.
- Let's pretend my hand is prey!
- Obstacle course!

It is clear when we watch the behavior of animals of a certain level of intelligence, that play comes *naturally* to them. This becomes even clearer when we watch them at play when they are young. When young animals at play are observed, it is clear that almost anything in their environment can be an excuse to initiate gameplay. To a puppy, for example, almost anything can be incorporated into gameplay, and that is true without anybody teaching the animal how to engage in this behavior. It is easy to observe that *gameplay comes naturally to animals* of sufficient intelligence, which hints at the possibility of play being fundamental to their well-being, due to evolutionary reasons. It may be linked to the animal's survival. This is as true for animals as it is for human beings.

Survival Skills and Make-Believe

Play is a relatively well-understood phenomenon. People from fields as diverse as behaviorism, anthropology, and biology have studied it, and a number of general findings can be agreed upon. First and foremost, it has to be understood that it is clear that there is very serious reason for this innate ability to be playful; it helps maximize the animal's chances of survival. Through play, valuable lessons are taught that clearly demonstrate this point. Through play, the young animal's skills are honed that are necessary in order to *hunt*, *fight*, *mate, hide,* or one of many other activities that are key to survival as an adult. Games provide a *safe context* in which these lessons can be learned through *play*. With this in mind, it is not controversial to state that *"Gameplay teaches skills that are important and necessary in order to survive in real life."*

This seems a straightforward-enough statement, but upon examination, a number of startling further conclusions can be reached. Not the least of which is the realization that animals are capable of grasping abstract concepts like *games* or *make-belie*ve It is irrefutable, however, because to engage in this kind of safe play, human beings (or animals that are capable of gameplay) need to be able to accept imposed boundaries and rules to their behavior. They need to understand that the gameplay experience is an artificial one. This means that fairly complex and abstract concepts are at play. We are, after all, talking about the understanding of something that is by definition an *abstract construct*, governed by a set of formalized rules.

Or to put it in other terms, when engaged in gameplay, we need to understand the difference between the rules that govern our *reality*, and those that govern the make-believe, or virtual, world of a *game*. This is quite an amazing skill, and the fact that we as human beings are adept at constructing and manipulating our experiences within these parameters is nothing less than remarkable.

Our propensity towards gameplay has far-reaching and interesting consequences. We see this ability to accept artificial, invented realities reach into areas beyond gameplay. For example, it is easily identifiable as crucial to the enjoyment of film, literature, art, music, and countless other forms of art and entertainment.

I will go into further detail with regard to this ability in Chapter 8, on immersion.

"Fun" as a Reward for Gameplay

It is safe to say that *good games are rewarding*. A good game is *fun*, or makes us *feel good.* But what is it exactly that creates this reward for us, and how does it work on a biological level? It needs no explanation that the answers to these questions are valuable to any level designer.

From studying gameplay in animals, we have learned that engaging in gameplay makes the animals feel good. They *want* to play games from a very young age on and need no prompting by external factors. In fact, they often do their best to initiate gameplay tendencies in others. Some of this behavior may originate from the fact that engaging in gameplay causes chemicals to be released in the bloodstream that act as a reward for playful behavior. This in turn makes animals *feel encouraged* to engage in this behavior. This is no accident, as the rewarding aspect of gameplay is *biologically necessary*. (This necessity stems from the need to learn survival skills within the safe context of a game, as we established previously.)

It only requires a small step to take this information and extrapolate to human behavior, which is basically the same. In fact, as already noted at the beginning of this chapter, our ability to understand games crosses the *species boundary,*[1] which is a strong indicator that comparable processes are at work. Much of human gameplay, when examined, bears striking similarities with gameplay in some advanced animals. *Hide and seek* or *tag* come to mind. We also are rewarded when we engage in gameplay, and in the case of humans, the chemical award is the release of certain pheromones, which make us feel good, or in other words, we experience "fun.[2]" Our large brains enable us to engage in games that are much more complex than those enjoyed by animals, but all the basic principles still apply.

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[1] If we take a moment to think about this, it should be apparent how truly extraordinary this is.

[2] See Raph Koster's book, *A Theory of Fun for Game Design* (Paraglyph Press, Scottsdale, AZ, 2004), for similar sentiments.