Rational Level Design

Introduction

This method of managing level design is used for any game that breaks down into levels, whether they be puzzle, platform, action-adventure, or even certain sports games.

The Rational Level Design optimizes the distribution of all Gameplay Elements throughout the game by presenting these Elements as a chart, that can be easily referred to by all team members.

RGD's Heritage

This implies beforehand, that both RLD and RGD have been thoroughly thought, that atomic parameters have been identified and combined as LD pattern. RGD is useless if it's not fully implemented in RLD. Moreover, your RLD will be incomplete or false if it's not directly inspired by RGD.

SUMMARY

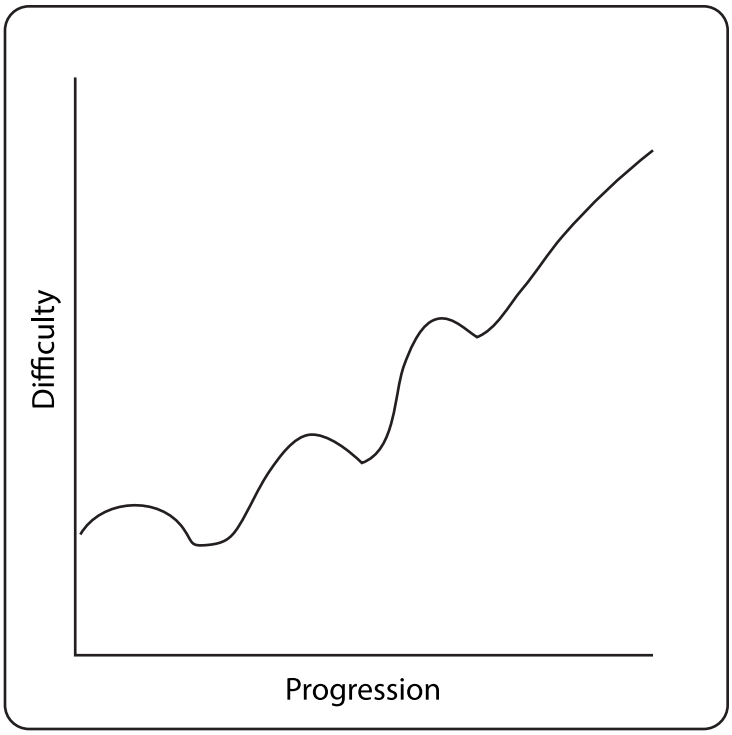
We'll explore all the steps necessary to create an RLD Chart, and how to best use the RLD method to suit your needs.
To help illustrate these notions, the presentation will be followed by a practical example.
Let's begin by looking at the many advantages of using the RLD method.

ADVANTAGES

In his book, « A theory of fun », Ralph Koster explains that : « Real fun comes from challenges that are always at the margin of our ability. » Indeed, challenges that are too easy offer no sense of any real accomplishment, and can in fact end up boring a player to tears. Challenges that prove to be too difficult, however, can often become infuriating, and even prevent a player from pursuing the game.

RPG EXAMPLE

In a Role-Playing Game, for example, let's say you want the player to encounter a Boss monster early on.
A small, harmless bunny rabbit would offer absolutely no challenge, while a ripped demon with a million hit points would prove to be invincible to any beginning character. Therefore, the perfect creature should test the player's limits, without exceeding them. After a few typical fights, a player will gain experience in the game's mechanics. To hold both his interest and the amusement factor at peak performance, the enemies a player encounters should gradually become more and more challenging. This way, he'll advance naturally from one combat to another, until he can finally confront the indestructible demon and actually have a chance of beating him.



PROGRESSION

To hold a player's interest, the difficulty level of a game should increase at the same pace as his abilities.
By transposing the difficulty of each level onto a curve, the RLD allows to easily identify which levels are too easy, therefore boring, and those that are too complicated, therefore frustrating.

FIRST ADVANTAGE
One of the first advantages of Rational Level Design is that it allows you to control the difficulty progression of a game.

DIVERSITY
A well-planned difficulty progression is not enough to hold a player's interest. If the task that needs to be done is always the same, the game will rapidly become repetitive, and the player's interest will decrease accordingly.
To maintain interest, you need Diversity!

PREHISTORIC EXAMPLE
Say you're working on an adventure game set in a prehistoric era. As a Designer, you decide that the first three levels will consist in trying to avoid immobile obstacles, and that the three following levels will consist in trying to eliminate flying enemies. This kind of repetitious gameplay would be sure to put any player to sleep. To add diversity, you need to alternate between different types of tasks and challenges, and add some where needed.

	Level 1	Level 2	Level 3
	X	X	X
		X	
		X	X

SECOND ADVANTAGE
By organizing the distribution of all the different challenges in a game as a simple Chart, the Rational Level Design allows you to create a well-balanced variety of tasks the player needs to accomplish.

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LEARNING CURVE
To allow this kind of variety, the hero of a game must consistently acquire new abilities; this means the player must also learn to master these new abilities as they come. This Learning Curve should be spaced out over a certain span of game time, to allow players the time to savor and master each new ability their characters encounter.

THIRD ADVANTAGE
By visually representing all the abilities that need to be acquired as a Chart, the Rational Level Design helps to properly pace this Learning Curve.
The RLD also offers other important advantages, a few of which will be explored later on in this capsule.
But this overview should already have underscored the importance of using the RLD method when designing levels.

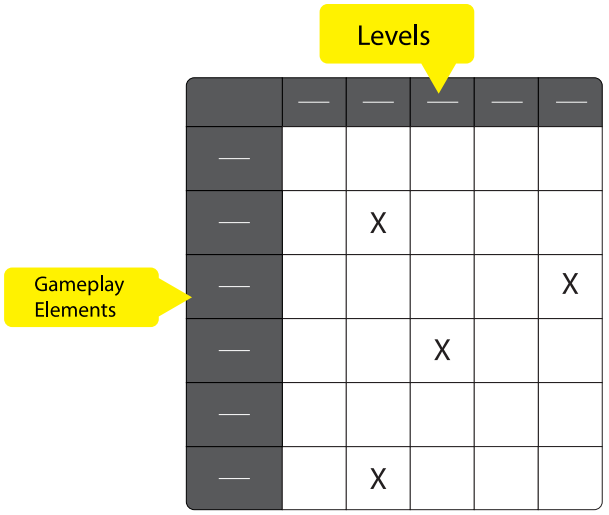
	—	—	—	—	—
—					
—		X			
—					X
—			X		
—					
—		X			

STEPS OF PRODUCTION

Step 1: Defining Gameplay Elements

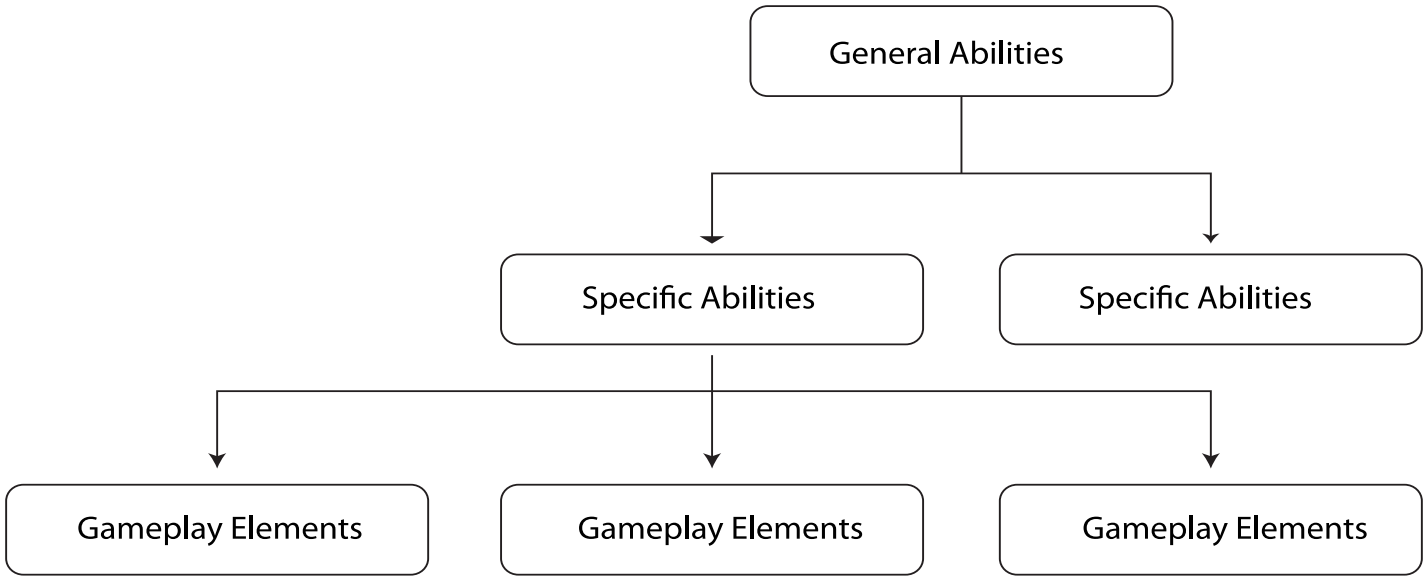
RLD is generally presented as a Chart that shows all the different levels of a game along one axis, and all the different elements that make up gameplay along the other.

The first step is therefore to define the different Gameplay Elements the Designers can call upon to construct the different levels of a game.



Specific Abilities

Gameplay Elements are based on a hierarchy of moves, at the top of which stand a hero's basic abilities, such as jumping, and attacking. These General Abilities are further subdivided into Specific Abilities. For example, the ability to Jump could also include a 'simple jump,' and a 'double jump', while an Attack ability could also include a 'right hook', and a '360° spin kick'.

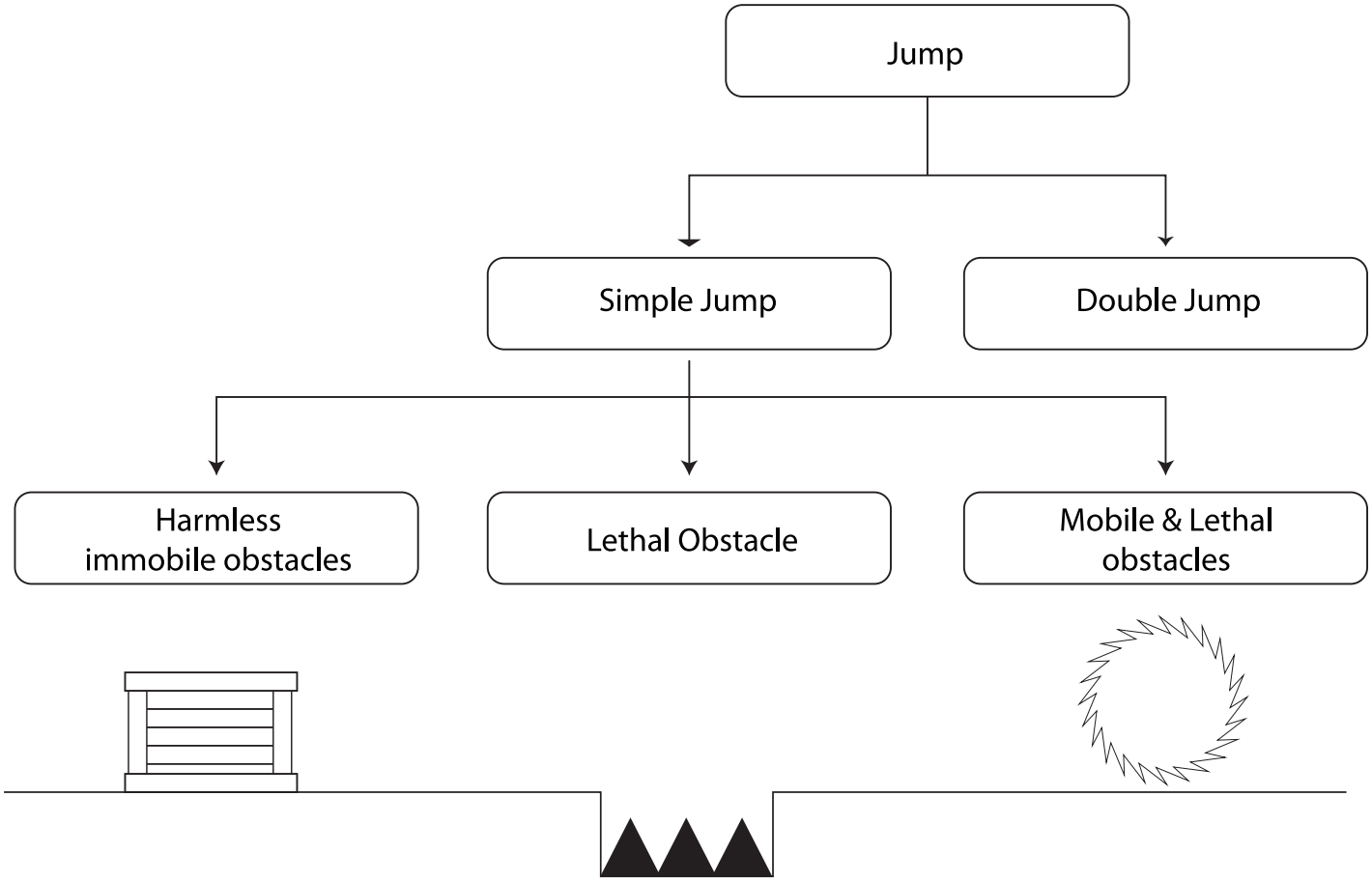


Gameplay Elements

In a game, different elements, called Gameplay Elements, are presented to the player in order to make him want to try out each of the hero's different Specific Abilities.

Example: Simple Jump

Let's go back to our 'simple jump' example. Among other things, 'simple jump' can be used to jump over harmless, immobile obstacles. Or it could be used to cross a small, yet lethal obstacle, or even cross a mobile and lethal one.
These three obstacles are examples of what we call Gameplay Elements.

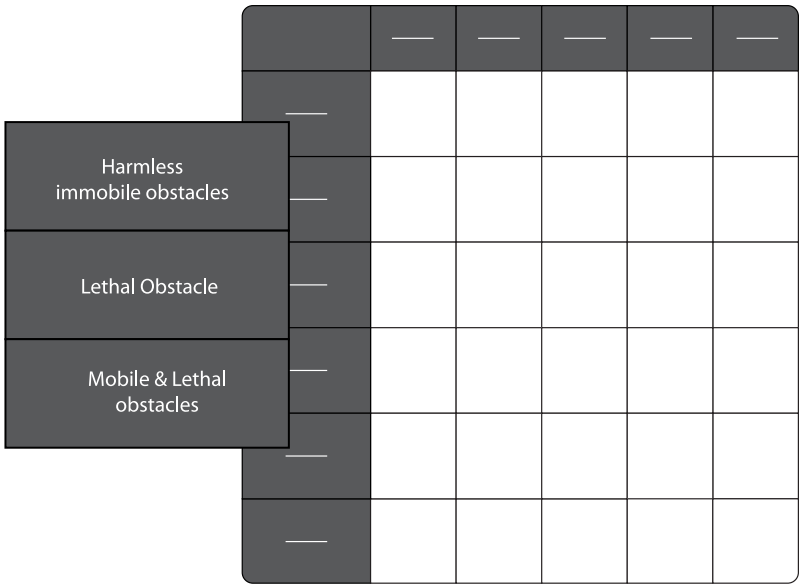


VERTICAL AXIS

These Gameplay Elements can be found along the vertical axis of the RLD Chart.

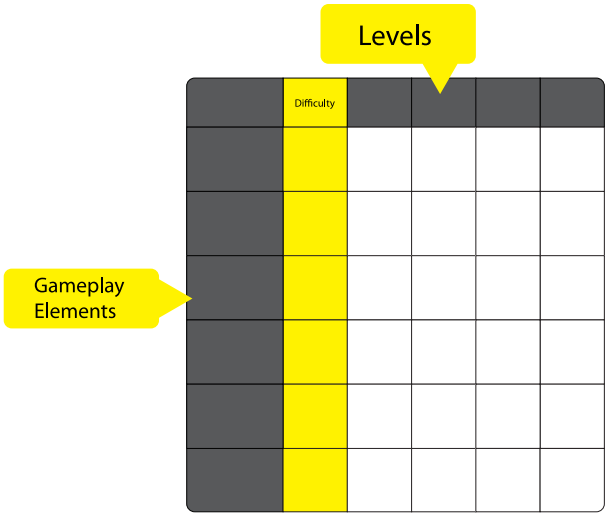
Obstacles

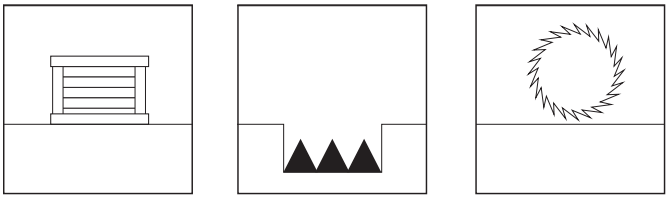
Please note that these Gameplay Elements are TYPES of obstacles, and not a specific description per se. The RLD Chart doesn't care whether the obstacle that forces the hero to jump is a box, a bale of hay, or a giant marshmallow. If the action created by a player, its context, and its repercussions are all the same, this is considered as a single Element of Gameplay. Game ingredients combined as such and put into context are classified as "LD pattern".



Step 2: Assigning a Difficulty Rating
Each of the different Gameplay Elements must then be assigned a relative difficulty rating.

This allows to classify each element as it relates to the others.
This difficulty rating comes from atomic parameters values that come from LD pattern of the RGD. Don't feel obligated to find a formula that calculates the difficulty if the formula isn't relevant.





Difficulty Rating
These ratings are dependent on the number of skill sets solicited, such as precise movement or reflexes, and the amount of experience required to overcome the challenge.
For example, does an obstacle require a little precision, or a lot ? Finally, there is also the consequence of failing to overcome an obstacle. Does it simply slow the player down, or does he lose a few hit points ? Or worse, the ultimate punishment, does failure signal the dreaded 'Game Over' to appear on the screen ?

Step 3: Placing the elements on the chart
Once the Gameplay Elements and their difficulty rating have been transposed on the RLD Chart, the Designer can now start distributing these elements throughout the different levels.
According to the style of the game and the Designer's preferences, this Chart can be filled with simple X's, or even with occurrence indicators, such as 'rare', or 'frequent'.

	Difficulty	Level 1	Level 2	Level 3	Level 4
Simple Jump (safe)	X	X	X	X	
Simple Jump (short)		X			X
Simple Jump (Long)			X	X	X

	Difficulty	Level 1	Level 2	Level 3	Level 4
Simple Jump (safe)	frequent	common	frequent	common	frequent
Simple Jump (short)	common	frequent	frequent	rare	
Simple Jump (Long)	rare		rare		common

	Difficulty	Level 1	Level 2	Level 3	Level 4
Simple Jump (safe)	1	2	4	2	
Simple Jump (short)	2		1	5	8
Simple Jump (Long)	3			3	5

To make full use of this Chart, in each level you design, it is recommended you inscribe the exact number of occurrences for each element you wish to include.

Color-Coding

When an element is first introduced, it is recommended you underline its presence by color-coding it.
Each new element you introduce requires the player to learn new skills, and color-coded visual references greatly simplify the Designer's job when trying to pace the Learning Curve of his game.

	Difficulty	Level 1	Level 2	Level 3	Level 4
Simple Jump (safe)	1	2	4	2	
Simple Jump (short)	2		1	5	8
Simple Jump (Long)	3			3	5

	Difficulty	Level 1	Level 2	Level 3	Level 4
Duration		1m	1m30	2m	1m
Theme		Forest	Junkyard	Desert	Candies
Simple Jump (safe)	1	2	4	2	
Simple Jump (short)	2		1	5	8
Simple Jump (Long)	3			3	5

Context

It is also possible to add simple information on the Chart, to provide an impression of each level's context. Such as a theme, or the length of a level, for example. However, the RLD Chart is not meant to replace the Brief, which remains an essential part of game conception. The Brief is the document that gives a better overview of all the themes and intentions of any given level.

Data Analysis

The numbers on the Chart should give the Designer an overview of the distribution of various Gameplay Elements throughout the entire game. But the RLD Chart is more than just a simple reference tool.
By compiling the data in a single document, this allows the Designer to analyze his level design more closely, and to optimize game quality from the very beginning of the game's conception.

	Difficulty	Level 1	Level 2	Level 3	Level 4
Duration		1m	1m30	2m	1m
Theme		Forest	Junkyard	Desert	Candies
Simple Jump (safe)	1	2	4	2	
Simple Jump (short)	2		1	5	8
Simple Jump (Long)	3			3	5
Diversity		1	2	3	2

Diversity Analysis

Let's go back to the example of our Chart.

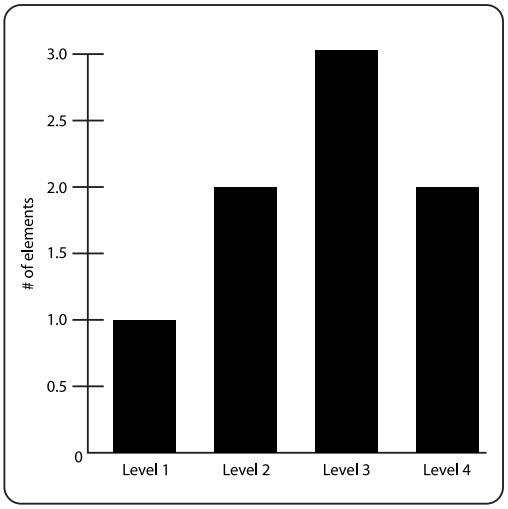
By adding up all the Gameplay Elements of each column, regardless of the number of elements present, we get the total number of different elements for that level.

This number represents the Diversity of the level.A very small Diversity number is a possible indicator of weak level design; the level might prove to be too boring, or repetitive. A very high Diversity number, however, should alert the Designer that his level might possibly lack focus.

Diversity Graph

If the Graph is made using a spreadsheet application, such as Excel, then the numbers can easily be presented as visual information.

This might seem futile in the example given, but when this method is applied to a real game, which can contain up to thirty different levels, each containing 10 to 30 different Gameplay Elements, a visual representation becomes invaluable.



	Difficulty	Level 1	Level 2	Level 3	Level 4
Duration		1m	1m30	2m	1m
Theme		Forest	Junkyard	Desert	Candies
Simple Jump (safe)	1	2	4	2	
Simple Jump (short)	2		1	5	8
Simple Jump (Long)	3			3	5
Cumulative Difficulty		2	6	21	36

Difficulty Analysis

The Chart also allows to evaluate the difficulty level for each mission. To do this, simply multiply the number of times a single Gameplay Element occurs in a level by its difficulty rating.

If the level contains more than one element, you must multiply each individual element by its assigned difficulty rating, and then add all the different sums together.

Modifiers

Certain parameters or conditions can influence the difficulty of a level as a whole without necessarily affecting its obstacles. In a shooter game, for example, a night mission scenario might hinder a player's visibility, or a rail transport might hinder a hero's movement. And weather conditions might greatly influence the outcome of a sports game.

	Difficulty	Level 1	Level 2	Level 3	Level 4
Duration		1m	1m30	2m	1m
Theme		Forest	Junkyard	Desert	Candies
Modifier				x1.3	
Simple Jump (safe)	1	2	4	2	
Simple Jump (short)	2		1	5	8
Simple Jump (Long)	3			3	5
Cumulative Difficulty		2	6	21	36

21x1.3 = 27

Modifier Impact

These conditions, or parameters, are called 'Modifiers', because they tend to affect the level as a whole.

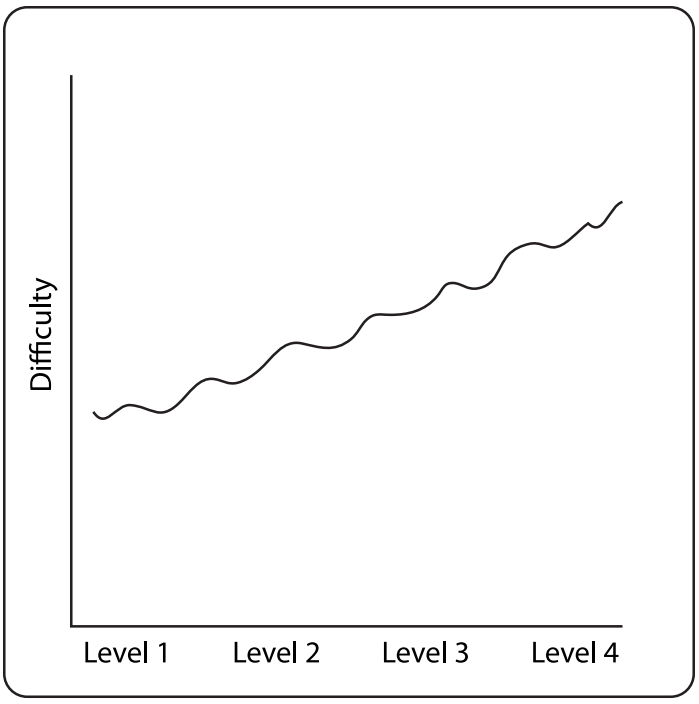
On the Chart, the Modifiers are used as a multiplier that affects the difficulty rating of a level.

In the example given, the difficulty rating for Level 3 would go from 21, to 27.

Difficulty Chart

The difficulty for each individual level can be placed along a curve. This curve represents the 'Difficulty Curve' for the entire game.

Without being completely linear, this curve should slowly climb upwards, increasing along as a player gains experience with his character's abilities.



Usefulness Analysis

Analyzing the Chart can also be made by following the horizontal axis, rather than the vertical one. By adding all the filled-in squares in any row, you get the number of levels in which the Gameplay Elements are actually used.

Once again, a visual Chart allows you to notice any anomalies more easily. A very high Usefulness number might indicate that the element occurs too often, leading to a boring game experience. A very low Usefulness number might indicate there's no real need for that particular element, or that it's spread too thinly throughout the game.

	Difficulty	Level 1	Level 2	Level 3	Level 4	Usefulness
Duration		1m	1m30	2m	1m	
Theme		Forest	Junkyard	Desert	Candies	
Simple Jump (safe)	1	2	4	2		3
Simple Jump (short)	2		1	5	8	3
Simple Jump (Long)	3			3	5	2

Rewards

And finally, in addition to representing all the obstacles a player needs to overcome during the game, the RLD Chart also allows a Designer to show all the various Rewards he will give the player to help keep him motivated. This allows a Designer to check if their rewards are diversified enough, well spaced-out, and appropriate for each level.

	Difficulty	Level 1	Level 2	Level 3	Level 4
Duration		1m	1m30	2m	1m
Theme		Forest	Junkyard	Desert	Candies
Simple Jump (safe)	1	2	4	2	
Simple Jump (short)	2		1	5	8
Simple Jump (Long)	3			3	5
Reward		New Weapon	New Ammo	New Healthpacks	New Power

Indicators

It is important to remember that the resulting Charts are merely indicators, rather that rules set in stone.
You might wish to keep certain anomalies in your level, in order to create a particular effect.
For example: an easier level might actually be necessary after a particularly grueling sequence of events.
And a short level with a weak Diversity of Gameplay Elements might also provide a much needed breather between two rather complicated levels.

Gameplay Symphony

The RLD is not intended to curb your creativity, it is meant to give it a basic framework.
By playing around with the numbers on the Chart, a Designer can alter the flow of his game, as a composer would with musical arrangements. The RLD Chart provides all the tools you'll ever need so your masterpiece turns out as a harmonious symphony, rather than a disastrous cacophony.

Mastering Rhythm

In the first part of this capsule, we saw that the RLD method allows a Designer to better control the difficulty progression of his game, that it helps him or her ensure a good Diversity throughout all of the levels, and that it allows to properly pace the player's Learning Curve. But the RLD also empowers the Designer to control the rhythm of his game.

Conclusion:

In conclusion, you must remember that RLD is a living tool that evolves accordingly as a project progresses. For each step in level design, Gameplay Elements can be modified, added to, or even scrapped, according to logic and logistics.
The RLD method is very versatile: it can easily be adapted to any project to better suit the needs of all team members.
By using the RLD method, and by diligently keeping it up to date, the design team on a project ensures that the quality of their game will remain optimal throughout its long production process.