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Understanding Balance in Video Games

By Keith Burgun

[*What's the value of balancing your game, and how do you do it? 100 Rogues developer Keith Burgun tackles the issue of game balance, bringing to light insights that aren't entirely obvious, and showing where game balance really counts.*]

"Dude, the AWP is *so* imba."

The slang term for "imbalanced" is heard frequently in online games, particularly in competitive games. Often, claims about "imbalance" come from a person who just lost such a game and is attempting to save face by placing the failure on the game and away from himself.

Usually, it is actually a combination of these. But sometimes, it really is just the game's fault. Balancing a game is a challenge that man has struggled with for thousands of years, and the battle continues in the realm of digital games.

The previously mentioned "AWP", for those who don't know, is a weapon in the super-popular online first-person shooter *Counter-Strike*. My personal opinion is that the gun is overly powerful; it's the only gun in the game that seems to be a one-shot kill, no matter where it hit you, whether you're wearing body armor, or behind how thick a wall you were hiding.

While I'm certainly not alone in thinking that (browse some servers on Steam and you'll see about a third of the active servers include a "no AWP" house rule), the debate continues to rage on.

Plenty of counter-arguments have been offered for why the AWP is indeed in balance with the rest of the game, but at the end of the day, it seems like it comes down to my opinion versus yours.

That's a major reason that balance in game design is so difficult to achieve -- it can be so difficult to *perceive*. There aren't always clean-cut, mathematical ways to balance your game; at the end of the day, it tends to come down to an educated guess on the part of the designers.

A game being "balanced" is also always, at best, a rough approximation. No game is truly perfectly balanced -- even in chess, one player gets to go first. A game being "in balance" is like a person being "in shape"; there's no strict, defined line at which a game goes from being in balance to out of balance, it's a gradual continuum.

Another thing that makes the task difficult is when you have to balance elements that function completely differently from each other. For example, if you're balancing an RTS, and the only thing that changes is attack damage and price, you could easily scale one up and one down when creating new units, and as long as you scaled them at the same rate, you could count on being pretty close to balanced.

Now, let's say we're making a kart racing game. In this game, there are several characters that each have their own ability. One character has an ability that allows him to fire a rocket to knock another kart out for a second. Another character has an ability that gives him a temporary speed boost. These are two abilities that function totally differently; there's no way to look at the numbers on paper and know what would be balanced. In a situation like this -- which is by far a more common situation than the first example -- all a developer can do is guess and check.

Why is balance important, anyway?

Gameplay is all about making choices and in a poorly-balanced game, many of the choices available to the player are essentially rendered useless. And this, in a nutshell, is why game balance is so important -- it preserves your game elements from irrelevance. In an imbalanced game, one or more "dominant strategies" quickly emerge, limiting other strategies useless except for some un-intended purpose (such as getting used as a handicap mechanism, or comedic reasons).

An example of this would be the "tiers" in competitive fighting games. There are usually three or so tiers of characters, with those characters agreed by the community as being "the best" in the top tier. Assuming that a player is attempting to win the game, choosing any of the characters besides those "best" characters is simply not a viable option.

Before I go on, I think it's important to be clear about what I mean by "dominant strategy". A dominant strategy, in the context of game design, is something that emerges due to game imbalance. A clear example of dominant strategy would be "blocking the opponent from getting three in a row", in Tic-Tac-Toe. That's a game that is rendered completely un-playable due to the obviousness of the sole strategy actually available to an aware player. This is the same way that dominant strategy damages or ruins games (although rarely to the same degree).

Levels of Scope

Characters in *Street Fighter II*, or weapons in *Doom*, or units in *Civilization* are examples of balance at the "elements" level. Sometimes, elements can seem imbalanced in a game when you're not looking at the whole picture. Many times, I've seen an extremely powerful element in a game, and initially said to myself, "Wow, that's *gotta* be over-powered!", only to find out later that there was a weakness to the element that wasn't immediately clear (the opposite happens a lot, too).

It's easy for a new player to think that Huntresses are an overly powerful unit in the early game in *Warcraft III,* but once a player realizes their subtly high costs, subtly high food counts, (and not-so-subtle way they get utterly ruined by Piercing or Ranged damage), they realize that they are paying a big opportunity cost by investing in a large amount of them. This is the type of balance that gets the most attention with most gamers.

There are so many areas in which imbalance can crop up, though. Let's take *Warcraft III* -- a game I played very intensely on the ladder for many years -- as our example. Firstly, you want to make sure that the *races* (factions of unit-types) are balanced, so that regardless of which race the player picks, they are not at a disadvantage. Then you need to balance the *units* inside the race against *each other*. When the game first came out (*Reign of Chaos*), spellcasters were too powerful, and so every battle was just a ton of spell casters versus another ton of spellcasters, regardless of race.

You also need to make sure the maps are balanced. You might at first say, "Well, that's easy! They just make the maps a mirror, and you're done!" But this is not so. You need to make sure that there isn't a dominant strategy for the map; so, expanding, creeping, attacking, and any kinds of sneaky attacks -- all (or at least most) of these need to be *equally* viable. That's already a lot to balance, and yet it's the standard for the modern RTS!

Then Blizzard added about five other mechanisms on top of that that needed to be balanced! Creeps, Items, Heroes, and even the competitive ladder itself all needed to be balanced. If you watch just a handful of *Warcraft III* replays today, you'll see that the game is clearly not balanced, as there are very clearly dominant strategies that get used over and over again. Balance is most likely the sole reason why the original *StarCraft*, which came out years before *Warcraft III*, is still more widely played and beloved by the community.

Balance in Competition

Historically, most competitive games have been, more or less, "symmetrical" games --games like chess or go, where each player starts out with exactly the same powers at his fingertips. This is nice, because at least then you know the powers are balanced between the two players. However, if you were designing chess, you'd still have to worry about the individual pieces being balanced. Yes, the queen is quite obviously more powerful than the rook, but the downside is that there's only one of her.

The idea of games with symmetrical forces has largely fallen out of favor in the era of video games, both for good and bad reasons. Some of the worst reasons sound like "players expect asymmetrical forces" or "more stuff equals better game". Some of the best reasons come from people like game designer and *Street Fighter* tournament player David Sirlin. In his article Balancing Multiplayer Games, he describes a scale, with symmetrical games on the left and asymmetrical games on the right.

RTSes are usually on the far right, fighting games not quite as far to the right. FPS games often are located toward the left, with class-based shooters being exceptions. He's careful to note that it isn't a qualitative statement to say that something is on either side; it's merely a matter of preference and how it works within the context of the game. However, I can say with confidence that the farther to the right on that scale your game goes, the more difficult balancing your game will be.

Compounding the problem of balance in games is the fact that a game can actually be balanced at the "professional" level, but imbalanced at the "intermediate" level. Meaning, sometimes a strategy will be way too powerful -- a dominant strategy -- at all levels of play except for the very highest.

Ideally, you want your game to be balanced at all levels, but for a moden video game of even average complexity, that's

asking a ton. It's best to figure out what you want your game to be, and then focus your balance efforts towards that.

If you want your game to be competitively played, then focus most on the top-level players. Talk to the best players -- people who play tournaments (if you are so lucky to have tournaments for your game). If you have a high-score leader-board, contact the top people on the list and pick their brain. However, if you want it to be more of a "casual game", then hand the game to random people, even people who've never played a video game before, and see what they do with it. **Tailor your balancing work around your audience.**

To balance a game at very low levels of play -- for something like a party game, for example -- you need to make sure that everything in the game seems equally useful on the players' first few tries. It is less important, in this example, that after hundreds and hundreds of plays, everything still holds up. If a dominant strategy emerges after hundreds of plays in *Mario Party*, that's not much of a concern. Just so long as a dominant strategy isn't emerging after the first dozen or so plays, that's probably enough for such a game.

What about single player games?

At the end of the day, you're balancing your game because you want to preserve your game's choices, and you want your game to be fair. This is true for a multiplayer game or a single player game, but there are some differences. In a competitive game, the spotlight will be shining much more brightly on the job you did of balancing the game, if for no other reason than because people will be looking for a way to get out of admitting they lost fair and square. But make no mistake -- if a single player game is to have any replay value, it must be well-balanced.

Today's Unique Balance Problems

One thing I've noticed in my study of board games, is that they tend to have a much longer life than most video games. The main reason for this is, they are simply more balanced. Chess has survived for hundreds of years; go has survived even longer. The famous board game Settlers of Catan was published in 1995 and is still as popular as ever! Most video games, especially of the last 10 to 15 years, just simply are not balanced enough to stand a test of significant time.

So why are so many games so poorly balanced these days? There are many reasons, but the largest ones are very clear. Above all else, it's that we live in a world of "more is more". It's in our cultural DNA at this time in history that the more stuff in a game, the better the game must be.

In reality, this is not the case. Games are a delicate, intricate web-like machinery of cogs and pulleys, and throwing one new cog into the mix can cause the whole contraption to grind to a halt. We should be building our games with as few elements as is possible to create the experience we wish, while reducing the chance of the machine falling apart, but instead, a quick glance at the back of the box announces proudly that this new game contains "8,000 moving parts".

Another reason behind all the imbalance we see today might be, ironically, the prevalence of post-release patches, and even mods. The ability for developers to send out patches every couple of weeks seems to be a double-edged sword at times. Obviously, it's a good thing that developers are able to fix balance problems after the game has been released.

However, I can't help but wonder if there's a greatly reduced need to, at release or at any point at all, just "get it right". When you're developing for a Super Nintendo game and the code you're sending out to manufacturers will essentially be chiseled in stone, I think that sets a fire under developers.

Mods may cause a unique problem, in that a game can actually end up getting credit for being balanced, even when it's only the case because of player-created mods. An example of this is the game *Elder Scrolls IV: Oblivion.* Anyone who knows me knows how much I hate this game -- I can't ever seem to shut up about it. But what's really interesting is that most of the people who defend the game to me, when pressed, reveal that they actually haven't been playing *Oblivion*. They've been playing a heavily modded game, a game which is no longer the game Bethesda Softworks authored.

I'm not at all saying that mods are a bad thing, or that people shouldn't make them -- I love mods, actually. I think that it's important to realize the difference between your game, and the game that people modded your game into. House rules also fall into this category -- game designers should remember that when they're adding house rules, they're no longer playing the same game.

Some Advice for Developers (and Players, too)

Know that imbalance is actually bad. The first thing that I think everyone has to do is to internalize the idea that balance is good, and imbalance is bad. I've actually heard people try to argue that a little bit of imbalance is necessary for a fun game. Not only do I disagree, but I think that they don't even really believe that. Someone who says this is simply failing to see one of two factors:

1. Like I stated earlier, there are sometimes elements that seem imbalanced when looking at one level of scope, but when looking at the whole picture are actually in balance.

2. That a game can be "fun" whether or not it's balanced -- the word "fun" is a notoriously crappy metric. Anything "can be fun" with the right attitude -- flicking a dust-ball around on the floor, brushing your teeth, anything.

If a game is fun despite being imbalanced, that's great, but do not make the mistake of thinking that it's fun *because* it's imbalanced.

Cherish Weaknesses. Valve's Robin Walker, lead designer of *Team Fortress 2,* said that the most important aspect of the

character classes in the game was actually their weaknesses, not their strengths. It's somewhat counterintuitive to think this way, but making sure that all of your game elements have a distinct weakness can be a great way to help you avoid dominant strategies.

Sometimes these weaknesses manifest in really interesting ways, creating interesting situations. One of my favorites is the super-destructive Demoman class in *Team Fortress 2*. Loaded with two types of explosives, he can quickly turn masses of foes into small barbequed chunks of flesh, and he's great at taking out sentry guns. He's also got an average amount of health and moves at an average speed -- which are the main knobs tweaked to balance most classes in the game.

So how is the Demoman balanced? Because he has no bullet-type weapons whatsoever. This means that besides using melee, the only way for him to kill anyone is to predict where they'll be, whereas every other class can attack by shooting where you *are.* It's a great example of a non-straightforward way to balance a game element.

Make Time for Balancing Your Game. Balancing a game is hard work, and this also means you should leave time in your schedule -- preferably, a lot of time -- to balancing. Teams will almost always have a "polish" phase, in which bugs are fixed, graphics are tuned up, and other details are addressed, and in this phase is where most if any of the real balancing will be happening.

Once the game runs well and looks nice, most developers will just ship the game, regardless of the state of balance. Don't do this! Make sure your game is as balanced as possible before it reaches your players. Yes, you can (and should) release frequent balance patches later on, but releasing a game that's clearly imbalanced from the get-go sends a very bad signal, especially to more seasoned players.

Make Balance a Priority. So the first step is to recognize that imbalance really is a bad thing, and the second step is to make balance a true priority in development. The fighting game tier system is the *players'* attempt to mitigate problems that should have been solved by the development team.

Since balance is something that can make or break your game -- especially in the long run -- then you should keep balance in the front of your mind at all times during development. When adding a new ability for a character, ask yourself "would that be hard to balance?" Remember that each new element you add to a game *exponentially increases* the difficulty of balancing the game, because you have to balance that element against every other element in the game.

Be Wary of Shortcuts. Maybe my most-hated feature about the aforementioned *Oblivion* is the automatic character leveling mechanism. When you start the game, and are at a low character level, all of the characters in the game have low level items and stats. When you level up, so too do all of the characters in the game. By the end of the game, the world is full of bandits running around in full glass armor, the most expensive armor in the game (what are they doing living a life of crime? They're sitting on a fortune!), and bears have *thousands* of hit points.

If it isn't immediately obvious why I hate this, the answer is twofold: because it makes the leveling system near-irrelevant, and because it's such a clear lazy shortcut on the part of the team that I get insulted and tune out. There isn't an easy way to balance a game; it's just a matter of putting in the hard work.

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