

Empirical Review of Challenge Design in Video Game Design

Michael Brandse¹ and Kiyoshi Tomimatsu²

¹ Graduate School of Design, Kyushu University

² Faculty of Design, Kyushu University

4-9-1 Shiobaru Minami-ku Fukuoka 815-0032, Japan

michaelbrandse@kyudai.jp, tomimatu@design.kyushu-u.ac.jp

Abstract. In this paper, we examine the concept of challenge in video games and argue that the current way of defining challenge is faulty in nature. Since challenge should be considered a core component to any digital video game, it is of importance that we understand the concept of challenge in-depth while designing games. With challenge being generally defined by its level of difficulty, we propose to define challenge by how challenge should be designed instead and have defined six characters by which a proper challenge should adhere. The goal of this paper is to clarify the concept of challenge and to redefine it according to the way challenge is created, not through the height of its difficulty.

Keywords: Mental model design, Patterns of DUXU solutions, Usability methods and tools, Challenge design, Video game design.

1 Introduction

Even within the design field, challenge is in many ways a unique concept. For design, the goal is generally to make experiences more accessible for users whereas challenge aims to achieve the opposite by making obstacles much more difficult to overcome. In the field of game design, challenge takes a very important role as most of a game revolves around overcoming challenges of various kinds. To games, challenge is a very important element to create a good user experience [1]. This is further confirmed by Johannes Huizinga, who stated that games are largely about overcoming something [2], giving further weight to the notion that challenge is integral to games. Juul, J., also heavily hints at this in his definition of what is a game, as games need to be “challenging” [3].

Since the earliest games like the famous Pong from the 1970’s, games have developed into a huge industry that is now catering to millions of people. Within this timeframe, the industry has gone through many transformations and innovations. Not just in the sense of scope, but also in how games are being designed. One element that has not changed is how challenge remains a core component to the majority of games. However, while the need for challenge has not diminished, the ways challenges are designed has. Back in the earliest renditions of games, designers simply didn’t know what made a good challenge. The result was a large variety of games that were too

difficult, impossible even, an issue that remedied itself as designers gained more experience. Along with the experience gained, designers have found a large variety of ways to incorporate challenge into their games.

However, along with this experience, the definition of what is challenge in games has become vague, with a tendency of defining challenge through its difficulty. This is a particular trend for instance among game developers and players of games, as they often refer to challenge in games in how difficult they are [4][5][6][7]. The goal of this paper is to redefine challenge, in such a way that it can be properly designed and used for further research.

2 The Challenge Dilemma

Even though the challenge has become something of interest, the field remains largely unexplored and has led to an erroneous interpretation of what challenge entails. Game designers and Academics alike seem to agree that a good challenge is one that is not too difficult nor too easy. Game designers often use the term “easy to learn, hard to master”, as an ideal to strive for [8][9]. This gives the impression a player should be eased into the game, giving the player enough instructions and practice for the player to master the basics. Through this definition, game challenge can be likened to the zone of proximal development.



Fig. 1. Zone of proximal development, modified for game design

However, when looking at challenge, this is actually of little consequence. This is because no matter the difficulty level, there will always be players for whom the challenge is either well or ill-suited. Making a game too difficult will alienate new players of games, but making a game too easy will turn off experienced players as well. When defining challenge through the means of difficulty, we are not defining the nature of the challenge, but we are defining the user group for whom the challenge is intended. In other words, if one talks about challenge in the context of difficulty, challenge becomes very subjective.

Furthermore, when defining challenge through its difficulty, we are actively ignoring the existence of various forms of challenge. If we look at this in reverse that also means that we are not able to effectively determine the difficulty of a challenge if we are not able to distinguish between what form of challenge we are looking at. A player of a role playing game, where most often a core component is to strengthen the player's avatar through patient grinding¹, is experiencing a different form of challenge than someone who is playing a first person shooter, where the player needs to gain mastery of weapons in order to be competitive in the game.

Taking all of this into account, it makes a definition based on the difficulty of the challenge problematic. But why is defining challenge of such importance? In related research so far, it is hard to find a proper definition of what challenge truly is [10][11][12]. Crawford, C. has tried to define challenge, but defined it through its difficulty and concluded there is no objective answer to what challenge is [13]. However, by defining challenge, we will be able to better design one of the core components to a game. Furthermore, if we are to create a standard for genres within games, knowing what challenges there are within games becomes important, as a game cannot only be classified by its theme and setting, much like you would with a book or a movie. It is also a necessity for other challenge studies to have a base set of definitions in regards to challenge. For instance, in studies such as those for dynamic difficulty [14], to know what forms of challenge exist in order to create dynamic renditions from those.

3 Redefining Challenge

When looking to define challenge, we should not be looking at the height of the challenge, but rather what the challenge entails. For this paper, we will be looking at challenge in its most basic form; challenge is an obstacle in the game world for the player to overcome. In order to properly define what makes a good challenge rather than a bad design, we propose a new paradigm to define it; we are going to be looking at what characteristics makes a challenge well designed and define challenge based on those characteristics.

For this paper, we have played a large variety of games across a large variety of platforms, spanning from the earliest platforms like the Nintendo Entertainment System, to current day platforms such as the Playstation 3.

Through our empirical research, we have found six characteristics to which challenge needs to abide for it to be well designed.

3.1 Core Game-Play

A Challenge Should be Solvable through the Core Game-Play as Established by the Game. A game should clearly establish what core game-play the game offers and should not deviate from that established core. All challenges the player must solve

¹ Grinding is an activity where the player collects experience points through defeating enemies within the game world, in order to make the player's avatar grow stronger and become more competitive.

need to be solved through this core game-play. It should be noted that this does not refer to additions which complement the core game-play, but rather elements that completely differ from the core game-play.

An often recurring problem in Japanese Role Playing Games is that the game requires the player to complete a mini-game². This becomes an issue when the player successfully completing that mini-game is a necessity in order to complete the game or gain important resources for progression that cannot be gained otherwise.



Fig. 2. Xenogears. The left part of the image shows the core game-play, where the right part shows a mini-game that needs to be completed to advance the game.

The core game-play of the game Xenogears³ involves the player and enemies taking turns. When the turn arrives, the player can choose what actions the player's avatar has to take. However, during the game the player will have to play a mini-game called "battling," which is essential in advancing the game. This mini-game is the opposite of what is established during the core game-play, in that it does not have the turn mechanic and is thus much more action oriented.

3.2 Technical Implementation

Challenge Should Not Be Marred through Bad Technical Implementation. A challenge should not be dependent on a faulty control scheme or otherwise faulty elements that prevent the player from overcoming challenge encounters within a game, such as (game breaking) bugs. Overcoming challenges should only be made more difficult through the encountered challenge itself, e.g. by introducing additional obstacles to a challenge that was previously overcome by a player. We should note that these concern flaws that affect the actions the player can undertake.

A common example of this flaw is the player camera. Since a player camera influences how much the player can see at any given time, the role of a player camera is of utmost importance in a game. Especially in games where the game-play requires the player to make skillful maneuvers, it is important that the player has a good understanding of the area in which the player current resides in. However, what often

² A mini-game is a small game within the main game itself, with rules that often differ from those established by the core game-play of the game.

³ Xenogears, 1998, Square Co., Ltd.

happens in games is that the player camera cannot be controlled or the camera working against the player, thus making maneuvers needlessly complex and often even frustrating.

3.3 Player Actions

The Outcome of a Challenge Should Largely Be Determined through the Actions of the Player. A player should have the ability to contribute a reasonable amount of input in order to overcome a challenge. When the outcome of a challenge is predominantly determined through outside influences, such as luck, it becomes a design flaw.

A common example of this particular challenge design flaw is in games where co-operation with a computer controlled character is necessary in order to beat the game, especially when the loss of said character results in a game over for the player. In these events, the AI of the character is of utmost importance in order to make the game playable. In the event that it is not and the computer controlled character causes more work and frustration for the player, it becomes an example of this particular design flaw.



Fig. 3. Resident Evil 5

In Resident Evil 5⁴, the player controls one character, whereas the other character is either controlled by a friend or by the computer. To finish the game, the player cannot lose this partner. However, if the partner is controlled by the computer, it will rush into enemies, fail to help the player or spend necessary items without any foresight thus creating a challenge where the player has little to no influence on the outcome.

3.4 Information

The Player Should Have at all Times all the Necessary Information in Order to Complete a Challenge. A game should provide all the necessary information required

⁴ Resident Evil 5, 2009, Capcom Co., Ltd.

to overcome the challenges in the game and should not require additional knowledge from outside of the game in order to complete it. This also refers to obscured content within the game that is essential for the player to see in order to effectively overcome it (such as an enemy sniper that can shoot the player from outside of the player camera's field of view).

An example of this design flaw regards platforming games⁵, games where the player needs to control an avatar and make his way through an obstacle course to reach the end of the level. Often, in these games, there are so called endless pits, holes that mean instant death if you fall into them. Because of this, these holes are associated with certain death and give the impression that they should be avoided at all times. Certain games however, require you to dive into one of those holes in order to find exits or secrets. Since this goes contrary to the player expectations and the game never gives the information that these endless pits could contain secrets, it should be considered a design flaw.

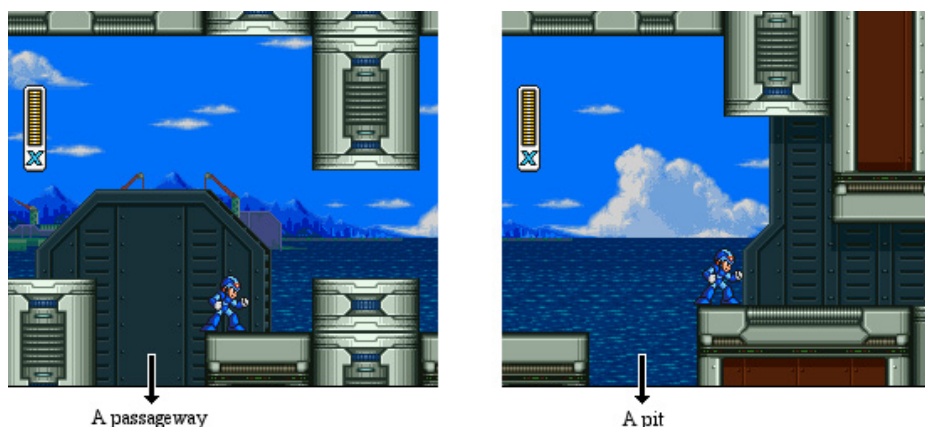


Fig. 4. Mega Man X 3

In Mega Man X3⁶, the player needs to avoid pits, as falling in a pit means the player has to start over. However, oftentimes there are passageways that look identical to pits, thus requiring the player to make a leap of faith.

3.5 Effects on Future Challenges

The Player Should be Aware of the Ramifications Player's Actions can have on Future Challenges. A player should always be aware what he can expect to happen in the future course of the game, when it regards elements that can impede the player's progress.

A very common example consists out of so called "missables", which are items in a game that are only available for a limited amount of time. Oftentimes, the player is

⁵ A platforming game is a particular type of game where a large part of the challenge comes from running and jumping over obstacles.

⁶ Mega Man X 3, 1995, Capcom Co., Ltd.

not informed about the limited availability of the item, or even of the item itself. The player can often only find out by chance the player is missing an item, or needs to look up guides for help in order to find them. This is especially frustrating when the item needed for completion of the game was a miss-able item and the player becomes unable to complete the game.



Fig. 5. Final Fantasy Adventure

In Final Fantasy Adventure⁷, the player needs to open locked doors with keys bought in villages. After entering the final dungeon, the player will be unable to go back again. However, the player is unaware of how many keys the player will need in this dungeon. If the player does not have enough keys, the player will be unable to advance and will need to restart the entire game.

3.6 Challenge's Advantage

The Challenge Should Not Have an Unfair Advantage over the Player. In early days, artificial intelligence (AI) in games was often limited by technical limitations of the hardware. For that reason, designers would give the AI advantages over the player



Fig. 6. Mario Kart: Double Dash!!

⁷ Final Fantasy Adventure, 1991, Square Co., Ltd.

in order to make the game more competitive to the player and to compensate for lacking processing power. This gave rise to a myriad of ways in which the AI could be “cheating” the player.

An example of this challenge design flaw is “rubber band AI,” which is an AI often used in the Mario Kart series of racing games⁸. What this particular kind of AI does is that when computer controlled opponents are lagging behind the player, they are given advantages in order to remain competitive and thus keep the challenge interesting. However, in various games this causes the AI to gain abilities that were otherwise impossible to have (e.g. having cars that become faster than their supposed maximum speed in racing games). This in turn causes frustration for the player as the player is unable to overcome the odds even though technically, the player should be able to do so.

4 Conclusion

This paper has proposed a new paradigm of defining challenge for video game design. Instead of looking at challenge through its difficulty, we proposed to look at challenge through how it is designed, as difficulty is too subjective to be an effective definition. For this reason, we state the most basic of a challenge as an obstacle the player has to overcome, which has to abide to six characteristics by which a proper challenge should be designed.

Using this new way of defining challenge, we believe that this will open up new research possibilities not just when it comes to challenge in games, but also in other fields that have been hard to define before due to lack of any standards. For instance, genre study for game design is notorious for being difficult to research as everyone has their own genre definitions.

5 Future Works

Using the way of describing challenge as defined in this paper, we wish to distill forms of challenge from them that can be applied to design. The goal is to gain definitions of forms of challenge that are not dependent on the definition of difficulty. We are going to do research this through the same means we have come to the results of this paper, namely through empirical reviews of games.

References

1. Cox, A.L., Cairns, P., Shah, P., Carrol, M.: Not Doing but Thinking: The Role of Challenge in the Gaming Experience. In: CHI 2012 (2012)
2. Huizinga, J.: *Homo Ludens: a Study of the Play Element in Culture*. Beacon Press (1968)
3. Juul, J.: *The Game, The Player, The World: Looking for a Heart of Gameness*. In: Copier, M., Raessens, J. (eds.) *Level Up: Digital Games Research Conference Proceedings*, pp. 30–45. Utrecht University, Utrecht (2003)

⁸ Mario Kart: Double Dash!!, 2003, Nintendo Co., Ltd.

4. Kain, E.: Games are getting easier, 5 reasons why that's a bad thing, <http://www.forbes.com/sites/erikkain/2012/06/28/games-are-getting-easier-5-reasons-thats-a-bad-thing/> (retrieved November 30, 2012)
5. Abbot, M.: Video Games Are Easier Than Ever, Yet Harder To Manage, <http://kotaku.com/5887020/video-games-are-easier-than-ever-yet-harder-to-manage> (retrieved November 30, 2012)
6. Etherington-Smith, J.: Are games getting easier?, <http://mygaming.co.za/news/columns/9207-are-games-getting-easier.html> (retrieved November 30, 2012)
7. Geoffrey, T.: FFD: are games getting too easy?, <http://www.lazygamer.net/general-news/ffd-are-games-getting-too-easy/> (retrieved November 30, 2012)
8. Malone, T.W.: Heuristics for designing enjoyable user interfaces: Lessons from computer games. In: Thomas, J.C., Schneider, M.L. (eds.) *Human Factors in Computing Systems*, Ablex Publishing Corporation, Norwood (1982)
9. Desurvire, H., Caplan, M., Toth, A.J.: Using Heuristics to Evaluate the Playability of Games. In: *CHI 2004* (2004)
10. Salen, K., Zimmerman, E.: *Rules of Play*. MIT Press (2004)
11. Rabin, S.: *Introduction to Game Development*. Charles River Media, Inc. (2005)
12. Church, D.: Formal Abstract Design Tools. In: Salen, K., Zimmerman, E. (eds.) *The Game Design Reader: A Rules of Play Anthology*, pp. 366–380. The MIT Press, Cambridge (2006)
13. Crawford, C.: *Chris Crawford on Game Design*. New Riders (2003)
14. Hunicke, R.: The Case for Dynamic Difficulty Adjustment in Games. In: *Proceedings of the 2005 ACM SIGCHI International Conference on Advances in Computer Entertainment Technology*, Valencia, Spain, June 15-17, pp. 429–433 (2005)