What Level Design Elements Determine Flow?
How Light and Objects Guide the Player in *Overwatch* and *Doom*

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Abstract

This thesis presents a comparative study between Overwatch (2016) and Doom (2016) to determine how these fast-paced games facilitate flow in their gameplay. The second chapter looks at formal definitions of flow and level design to establish a vocabulary for following chapters. Through formal analysis the level designs of both games are then examined to establish what elements in them guide players and keep the flow in gameplay. The thesis also examines how the initial gameplay design principles, which are rooted in the older shooter genre, have impacted the level design. The author uses screenshots from both games, interviews with the design teams and published literature on game design for the study.

It was found that the architectural design of a level in hero-based gameplay (Overwatch (2016)) could control the pacing by changing the elements that enable certain types of movement such as climbing or creating setups that favor one team over the other. On an individual player level, flow is kept with intentional placement of light and bright colors to guide the player. While Doom (2016) uses different abilities and movement sets for its hero, the tools of guiding the player proved to be very similar but with heavier focus on environmental markings and lights. In both cases the look of these guiding tools was adapted to fit into the game world without breaking the player’s immersion.

Keywords: Computer games, level design, flow, game design, architecture, fps.
Abstract


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Glossary of Terms

First Person Shooter (FPS)
First person shooter refers to a genre of games in which the camera is set up to let the player see the world as their avatar would see it and the game mechanics are centered around combat.

Level
Level in video games can either refer to a physical area of a map players either travel through or interact with such as a for example cave or a numeric instance of the players’ current skill level.

Flow
Flow is the more generalized term for pacing and progression where “good flow” in a game means that players progress seamlessly through the game’s levels without breaking the game’s immersion.

Affordance
Affordance refers to the number of types of possible interactions with objects in the environment. The higher affordance an environment has, the greater the possibility of alternative navigation routes through the environment.

Telegraph
Telegraphing as it pertains to level design is when objects in the distance signal to players that something is either coming towards them or showing what they are working towards. For example, a lit door at the end of a darkened hallway.

Spawn Point
Refers to the location where players start the game. It is the area where they can be revived if they have died.
1. Introduction

Immersive gameplay is vital to all aspects of game design but how do developers design gameplay which causes the least amount of immersion breakage. How is level design affected by the playable characters’ abilities to maneuver and interact with the environment within the level? If a player’s abilities to explore and traverse are being hindered, or if their current abilities are inadequate to overcome the challenges they face, the players risk losing immersion in the game. So, how are levels designed to reduce this?

“Heroes” and “Doom-guy” are references to different player avatars from the two games this study is based on. “Heroes” comes from the online fps multiplayer game Overwatch (2016) where players control one of several heroes, all with their unique abilities and means to traverse and interact with the environment. “Doom-guy” is the space-marine protagonist of the Doom (2016) single player campaign.

The first part of this thesis’s title “What level design elements determine flow? How Light and Objects Guide the Player in Overwatch and Doom.” addresses two theoretical parts of level design: principles and flow.

To establish what principles exist in a field which is heavily dependent on which genre it is and as its own individual game. What principles determine which elements should exist and their placement so they enhance flow and do not disrupt it. In turn provides immersion by catering to players’ suspension of disbelief.

The second part of the thesis consists of a practical examination of the two games to pinpoint these elements within their levels to determine if they create and continue to enable flow. The purpose of this thesis is to examine what level design principles exist to curate flow and then to compare two games with different mechanics and player abilities to examine how those principles are applied in each game to support the intended experience.
2. Background

These two games were chosen since they were both nominated for the same awards during 2016’s Game Awards. They were nominated for:

- Game of the Year, which *Overwatch* (2016) won.
- Best Studio/Game Direction, which *Overwatch* (2016) won.
- Best Action Game, which *Doom* (2016) won.

Both games are also grounded in the old-school fast-paced FPS shooter genre. Jeff Kaplan game designer on *Overwatch* addresses this in the GameSpot video interview (GameSpot 2016) *The Story of Overwatch: Return of the 90s Shooter* (which refers to *Doom* (1996), *Quake 2* (1997), *Team Fortress Classic* (1999) & *Team Fortress 2* (2007)) and how these games have influenced the *Overwatch* (2016) development.

In the interview Kaplan talks about how they want to bring back fast-paced gameplay with free-flowing movement abilities. In his opinion, this has been lost over the past decade as the design philosophy in the fps genre at large has moved closer toward mimicking reality. The goal of *Overwatch* (2016) was to bring back intuitive gameplay where players compete to get to alternative vantage points and use unique abilities to maneuver as well as neutralize enemies. With focus on the player’s ability to control how they traverse through a level. Kaplan continues to explain their level designs guiding goals and how they work to facilitate this. These are:

- **Heroes First.** Levels are meant to support the heroes’ differences and so they are built to create different opportunities for each hero’s movement abilities and skills. Maps should feel intuitive enough to navigate that they do not draw away attention from the heroes.
- **Diversity of Experience.** Levels should be playgrounds for different playstyles and skill levels, with built-in vantage points to climb and choke points for close combat. Environments should be diverse enough for all hero types to shine.
- **Clarity of Space.** Players should be able to smoothly navigate levels even if it is their first time playing them. They should have enough affordances to clearly direct them and distinguish between travel areas and locked areas. Every playthrough, players should find new, alternative ways to maneuver through the level. The environment should be visually clean, with clear points of interest.
- **Immersive World Fantasy.** Each level should be a fantasy-rich and inspiring version of real-world locations to further immerse the player in being the hero. Environments should also provide a clear view of distant areas to make the levels feel as a part of a larger, surrounding world.

*Doom* (2016) is heavily influenced by its predecessor from 1996 in terms of level layout and how they make speed into a key element for more intuitive gameplay. In an interview (Graft 2017) Marty Stratton game director on *Doom* (2016) talks about this and how the team aimed to recapture the original game’s essence of fast-paced, agile combat. Creating a fundamental core design principle of gameplay resulting in a constant push-forward combat tactic. Stratton defines this as combat chess, consisting of:

- **Speed of movement.** Players’ ability to in an agile way move around in the environment.
• **Individuality of demons.** Prioritize enemies based on their unique traits and how they work in unison, variation of demons presents different challenges.

• **Distinctiveness of the weapons.** Like distinctive enemies determine which weapon best deals with facing various kinds of demons as well how they feel to interact with.

• **Overall power of the player.** Players’ health, weapon damage, reload speed and how well they are equipped overall to face various kinds of demons and obstacles.

• **“Make me think, make me move”**. This concept refers to a style of gameplay where, due to the player’s fast movement speed, challenges must be solved as they move through the environment. So, all information needed to solve those challenges must be clearly visible and easy to understand as the player maneuvers the environment.

In the same interview Stratton also states:

“The right size arena, with just the right amount of space, actually made the players feel even faster, … Your top-end speed is good but you’re more agile than you are fast. If you’re in the right space, it can just feel perfect. We spent a lot of time during development finding exactly what the rightsized spaces are for Doom to make you feel quick and agile, but still under control.”

Here both Stratton’s and Kaplan’s design principles match, both are looking back into what now could be called classics. Striving for gameplay where a player’s control over their avatar determines how good they are at the game, as long the game provide enough feedback and has mechanics that are in tune with the levels they traverse. To summarize, there are similarities in both design philosophies, showing that they strive for:

• Core gameplay centered around player avatars and their abilities.

• An immersive world with plenty of affordances for varied playstyles.

• Simple but stylized environments which clearly show that the avatar belongs in them as well clearly showing how to traverse them.

So, what have these games done to facilitate these design goals and how does these it affect the flow within the games. What elements do their levels contain and what principles have they used to guide their players?
3. Previous Work

This section explains the fundamentals and guiding principles of level design to provide a vocabulary for the methodology.

3.1. What is a Level?

Game development terminology describes the term “level” as multifaceted. Scott Rogers writes in *Level Design: Processes and Practices* (2017:102) that a game level can be the environment the player is currently traveling/performing actions within. As well as a numeric sense of how far they have progressed within the game or as a representation of an avatar’s power. In his book, *Level Up: The Guide to Great Video Games Second Edition* (2014:225) he defines four different variations for this term, Rogers states that this is due to a limited professional vocabulary within the industry. These are:

- Level: Environment/location where gameplay occurs.
- Level: Physical (in-game) space based upon specific gameplay experience.
- Level: Unit of counting player’s overall game progression.
- Level: Term for marking character progression and improvement.

The first two definitions are aimed toward environmental aspects where the first encompasses the larger play space and the second definition refers to the smaller sections within the space. For example, the desert in *Diablo 3* (Blizzard Entertainment 2012) represents a large level that the player can travel through and at various places there exists explorable caves. The caves are parts of the desert level but each cave is their own level and would be broken down to more levels if the caves would contain various locations.

Anna Anthropy (Anthropy, 2014:40) explains this divide further by defining and breaking down levels as scenes which in themselves are built by various scenes, “A scene is a more atomic, fundamental unit of gameplay than a level, or a world, or a region in a game world.” To continue the previous example from *Diablo 3* the various rooms within the cave are independent scenes connected by traversal scenes. A traversal scene would be a bridge presenting a challenge the player must clear to proceed, Anthropy means that if any form of progression occurs it is a scene of its own.

For the scope of this thesis levels are defined as Rogers described them as a main level containing certain sublevels instead of the in-depth definition which Anthropy talks about. Instead Anthropy’s definition of scenes, especially traversal scenes is being used to examine how levels facilitate flow.

3.2. What is Level Design?

Ernest W. Adams in his book *Fundamentals of Game Design, Third Edition* (2013) explains it as “The level designer creates not only the space in which the game takes place—its furnishing and backgrounds—but also the player’s moment-by-moment experience of the game and much of its emotional context.” He also notes that level design is “…the process of constructing the experience that will be offered directly to the player using components provided by the game designer.” (2013:439)
Christopher W. Totten in his book *Level Design: Processes and Experiences* (2017: xxv) makes the distinction between level design is neither art nor game design even though it is dependent on both, just as they are dependent on it. Level design is not about the creation of assets or definition of game mechanics but a middle point of both as the level should work to facilitate core mechanics and thus shape its landscape accordingly. To make use of assets so they enhance, rather than hinder flow in the game. Ernest W. Adams argues as well that it is the level designer who puts it all into practice as they design the challenges and set the mood in the levels (Adams, 2013:441).

Huaxin Wei and Chaoguang Wang (Totten, 2017:57) also state that level design is its own position, apart from that of game designers and environmental artists. It is the role of the level designer to guide players through the game and so they must work in close tandem with programmers and artists as “In the actual design process, it is important to communicate with artists and programmers to get their attention on the functionality of a game level, which is realized in both the operational and the presentational structures.” They write how the levels are more than their design and visuals, they embody the player’s possibilities to navigate through and interact with the level.

Jess Schell states in his book *Art of Game Design: A Book of Lenses* (2014:343): “All a level designer does is arrange the architecture, props, and challenges in a game in ways that are fun and interesting — that is, making sure there is the right level of challenge, the right amount of reward, the right amount of meaningful choice, and all the other things that make a good game. Level design is just game design exercised in detail — and it isn’t easy, for the devil is in the details. Level design is different for every game, because every game is different.”

This thesis will view the position and work of a level designer as one who builds the player experience based on a design goal with the tools made available from programmers and artists alike.

### 3.3. What is Flow?

One of the challenges with level design is to determine how the dramatic curve is shaped throughout the level so as to produce a balance between action sequences and rest areas. A generalized term for this is called “flow”.

The vision for each level is for players to flow seamlessly through them without breaking the game’s immersion. Mihaly Csikszentmihalyi (2016:232) talks about flow from a general perspective of everyday life and the different obstacles people face, although these are applicable on games as well. Csikszentmihalyi suggests three conditions which must be met to produce flow.

- Firstly, when the activity shows “…a clear set of goals”. These goals are intended to provide a purpose to the intended activity and keep channeling the player’s attention for the duration of the game and so keep them immersed.
- Secondly, flow is “…a balance between perceived challenges and perceived skills.” If the challenge is greater than the players’ current skillset it risks becoming frustrating as the odds for them to overcome the challenge diminish. If the player’s skillset is greater than the challenges it risks becoming dull, the balance between these two should allow the players to face and complete challenges equal to their skill.
• Third and final is “...clear and immediate feedback.” Players should not doubt where they are going given what their goal is and so levels should always inform the player how they progress.

These three conditions of clear directional goals, clear understanding of skill versus challenge and constant feedback will be the lens this thesis examines the games through.

3.4. What is the Goal of a Level Designer?

Ernest W. Adams lists certain principles regarding level design and explains briefly what is essential about them. These principles are (Adams, 2014:439-440 & 450-456):

• “The space in which the game takes place.” It’s the game designer job to create the games features but it is the level designer who determines when, where and how those are presented.
• “The initial conditions of the level.” Here Adams refers to expendable resources within the level such as number of enemies the player faces or resources they either gain or lose.
• “The set challenges the player will face within the level.” What challenges the level produces, either environmental obstacles or enemies as well as in what sequence they appear.
• “The termination conditions of the level.” What must the player accomplish in order to complete the level and in what ways can they fail?
• “The interplay between the gameplay and the game’s story, if any.” If the level has a narrative its design must present it accordingly to the player.
• “The aesthetic and mood of the level.” How the player experiences the intended aesthetics is up to the level designer. They are given a tone and then decide at what pace it is revealed.
• “Atmosphere.” This connects with the aesthetics of the level although in a larger sense as it encompasses lightning, colors, visual effects as well audio to produce the intended experience.
• “Pacing and progress.” This ties into what conditions and challenges exist in the level, as it determines how frequently the players are challenged and when they have a moment to rest.
• “Tutorial levels.” They are separate from the main game levels and are a safe-zone where the player can learn new abilities and where new challenges are presented in a set order.

Out of these principles, this study looks foremost at the architectural space within the level and how it is designed to form paths and how the atmospheric effects provide visual guiding tools. It also looks at environments from two aspects. What challenges the layout presents based on the limitations of character movement and how players overcome these challenges. Also, how environmental markings are placed to direct players.
4. Purpose

The purpose of this thesis is to gain an understanding of which elements and principles determine flow. Then see how these are used to guide players in fast-paced games such as *Overwatch* (2016) and *Doom* (2016).

This will be accomplished by firstly conducting a comparative study of these two games to analyze their flow based upon knowledge of what guides a level designer and which goals they strive towards. This study emphasizes the importance of designing a seamless flow throughout the level, allowing players to become immersed in the way they travel and interact with levels through gameplay.

Secondly by conducting a formal analysis of the levels from these games to determine how their architectural layout is designed. How do these environmental elements work with how players traverse throughout the level? The focus is on gaining an understanding of how these game levels are executed to constantly guide the players forward with minimal risk of breaking immersion. The underlying question is:

What in these environments subconsciously guides the player during play?

4.1. Limitations of the Study

This study only examines *Doom* (2016) and *Overwatch* (2016) which are both heavily influenced by gameplay from the early 90’s. It is not a comparison between these games and their predecessors even though that would give interesting data on what has changed since then. Instead this study looks at how these games have combined old and new design principles in their level design.

The comparison is conducted using previous research regarding level design to learn what principles of level design exists and how these are applied. To back up these principles this study looks at documented video interviews and articles with the design team. Based on these articles it can be extracted how their work was conducted which is then later cross-referenced against the set of design principles.

No interviews have been conducted with either team due to time-restraints on the project even though it would wield more accurate data than extraction from documented interviews.

This study only looks at the single player campaign of *Doom* (2016) and the initial hero roster and maps at the release of *Overwatch* (2016). It does not give a thorough review of all the maps, levels and avatars as that would be outside this thesis’s scope.
5. Materials and Methods

The following section explains the methods used in this study: “What Level Design Elements Determine Flow? How Light and Objects Guide the Player in Overwatch and Doom.”

5.1. Formal Analysis

Formal analysis is a research method that is applied by choosing a certain artifact and closely examining specific elements connected to it. Lankoski and Björk (2015:23) state it is a fundamental method to provide an understanding of game system which later can be used for a further analysis of the selected artifact. It is also stated that “Formal analysis of gameplay takes a basis in studying a game independent of context, that is, without regarding which specific people are playing a specific instance of the game.” What is important is the connection between the artifacts and their elements.

It is a research method dependent upon either replaying or closely observing others playing the chosen game to gain a deep understanding of how its systems and dynamics work. What are the game’s elements, rules and goals and how do these come together in the system? Lankoski and Björk talks about how the focus of conducting a formal analysis is to ask questions about these elements, such as how they work and how they deliver the intended experience.

5.2. Analysis Procedure

This thesis is a comparative study of flow in level design found within the levels of Overwatch (2016) and Doom (2016). The flow is examined by first singling out what elements in the levels guide players and how consistent they are throughout various levels and then by comparing elements found in both games to determine if any similarities exist.

Elements of flow are for example architecture layout, environmental objects/markings and various visual effects. Examples of these might be how a building is designed to open/close a line of sight or how objects and environmental markings form directional arrows. How lights and sounds draw players’ attention. These are the most commonly used ways to guide players but it is sometimes difficult to make them feel integrated within the level.

Both games are analyzed in three steps. These are:

- During gameplay distinguish the following elements:
  - **Architecture**: How buildings and paths provide moment-by-moment information as players traverse. How they are shaped based upon the avatar’s mobility and do these affect the line of sight.
  - **Objects**: How objects such as crates, ladders, ledges etc. either become hindrances and blocks paths or provide alternative traversal routes.
  - **Markings**: How environmental markings such as signs, scrapes, blood etc. form directional arrows.
  - **Visuals**: How visual effects such as wind, light and sounds are meant to draw the player’s attention to them and guide them further along.
• Do these elements fit into the three flow categories?
  o *Clear directional goals*: Are players always aware of where they need to be going by following these elements.
  o *Skill vs Obstacle*: Are players able to overcome obstacles while moving or do they have to stop.
  o *Clear Feedback*: Do they provide clear visual feedback before and while players interact with them or as they pass them.

• Do these elements and flow categories support their initial design principles?
  o *Avatar based gameplay*.
  o *World created for various playstyles*.
  o *Clean world for quick reading*.

This approach is looking at how the landscape and objects in the environment allow the players to either traverse the level or stop them. Does the background continuously telegraph where players should go next and is it all in coherence with the game’s overall aesthetic and design? A different approach to this study would have been to conduct interviews with the design team behind both games about their process and the principles they have followed. This would have given concrete data on their work, how they chose their elements and most importantly why they chose these. However, this would not have been possible given the scope of this thesis.

5.3. Data Gathering

The level design in these games is examined by studying screenshots from within the game during gameplay. All screenshots from within the games are taken by the author unless credited elsewhere. Research regarding level design and its practices are gathered from various published books about game design by authors such as Ernest W. Adams and Christopher W. Totten. Information about each game specific design principles is gathered from interviews with and articles by the game design teams.
6. Results

The following section presents the results from using the previously stated methodology to analyze Overwatch and Doom.

6.1. Overwatch

*Overwatch* is a multiplayer online fps game developed and released by Blizzard Entertainment in 2016. Each player controls one of a variety of heroes in a competitive six versus six-person teams. The goal of each match is to capture an objective through one of several game modes, and in doing so defeat the enemy team (Blizzard 2016a).

At launch the game featured a roster of twenty-one unique heroes and twelve maps based on real world locations. The game is set 60 years into the future and Jeff Kaplan (Variety 2017) talks about their vision during development. The aim for these levels was to create an imaginary reflection of what our current world could come to be in a society with heroes. Rather than a realistic translation of what exists today, they strived to build a better future for the world. Show something more than war torn cities and grim gray environments, something we could strive towards and hope for.

Kaplan goes on to talk about how each area should be a place their players would want to visit. Levels should be a place where they would want to spend a long time, they should allure players to explore them and try to traverse them in as many ways as possible.

6.1.1. Avatar Mobility

For this thesis *Overwatch’s* hero roster is divided into three categories based on their mobility, high, medium and low. High mobility heroes can climb walls or have an ability which allows them to reach high vantage points, alternatively use this ability to find other routes to the objective.

Hanzo (see Figure 1) is one of the heroes with high mobility. He is a ranged attack hero with the ability to, for a short duration climb walls, both in a vertical and horizontal direction. Hanzo can also leap off in any direction can while climbing. (Blizzard 2016b).
Hanzo’s climbing ability depends on his distance from the wall. For Hanzo to climb walls they must be relatively clean from any sort of bumps or extensions, and to climb over edges they cannot extend too far out from the wall. During the climb players are facing the wall, removing any possibility to respond should an enemy player appear which makes Hanzo an easy target for the duration of the climb. This risk of being ambushed has the potential of a high reward, should players reach a high vantage point from which they can utilize their long-ranged attacks.

Medium mobility heroes have abilities that allow them to either temporarily fly or teleport, which can be used to gain an advantage during fights or avoid areas by passing over them. Pharah (see Figure 2) is one of the heroes with medium mobility. She is a ranged attack hero equipped with a jetpack that allows her to leap into the air to either levitate for a short duration or fly short distances. In addition to her jetpack she has an ability that allows her to burst short distances. When this ability is used midair, Pharah can reach higher areas, alternatively cover more distance in a shorter amount of time (Blizzard 2016c).
While Pharah is airborne she has limited movement speed, making her slower in the air than she is on foot. With no option for cover she risks becoming an easy target since players must look in the direction they are flying. She also requires open outdoor areas to fully utilize her flight potential which restricts her indoors. It also allows her to reach high vantage points with the tradeoff of being more easily spotted by enemy players.

Low mobility heroes are restricted to the ground and have no abilities for either exploring alternative routes or reaching advantage points. Reinhardt (see Figure 3) is one of the heroes with low mobility. He is a melee range attack hero with the ability to charge towards enemy players in a straight line and pin them against obstacles (Blizzard 2016d).
Being restricted to the ground has no actual disadvantages since each level offers various rooms and other passages which offer protection from any attacks from above. At key points in each level, heroes with high mobility are forced to descend to proceed further or clear an objective. Although that is not to say that medium and high mobility heroes cannot use the ground to the same extent as low mobility heroes. Rather they are suited for an agile playstyle which uses the environment to their advantage if they can traverse freely and be used to their full potential.

To support the different kinds of mobility as well as to increase the attraction for players to explore and seek alternative routes, Blizzard has removed drawbacks such as fall damage. Players falling from great heights take no damage upon landing, as long as they fall inside the level’s perimeter. This makes exploration risk free, so players do not need to hurt their avatar should they fall down into a group of enemy players. Instead they should be given the element of surprise and rewarded for their interest in exploring the levels in detail. The strength of a hero’s abilities is therefore dependent on the player’s expertise. This feeds into players having to become more observant of their surroundings since enemy players could potentially come from various directions, creating an active gameplay.

6.1.2. Level Layout

The level layout in Overwatch maps changes throughout the game to give advantage to different teams, attackers/defenders and different mobility heroes. Early in maps advantage is often given to high and medium mobility heroes through open spaces with alternative route options. This can be seen in both the Hanamura (see Figure 4) and Kings Row (see Figure 5) map. In both maps their first objective of two is displayed, these are capture points where one team is defending and one is attacking. In Hanamura attackers come through the gates on the right side and despite those being the main point of entry there are four different openings surrounding the door. There is open sky for flying heroes to enter and navigate and on the
right of the gates there is an entrance into the little house providing cover for low mobility heroes.

This open space and short distance between covers favor low and medium mobility heroes since most walls have larger extensions and most roofs are leaning downward making it difficult to climb and find a vantage point.

**Figure 4:** In-game screenshot taken from the Hanamura map, Overwatch. The first objective is located inside the house to the avatars left.

**Figure 5:** In-game screenshot taken from the Kings Row map, Overwatch. The first objective is located behind the trees and car to the avatar’s right.
For King’s Row attackers come in from the left and just like in Hanamura there is plenty of open sky and the statue in the middle offers a two-way split. Just like Hanamura, this location provides an open space with some cover options for low mobility heroes. This location is favorable for low and high mobility heroes due to it containing more objects which block teleportation and force flying heroes to expose themselves. This puts medium mobility heroes at a disadvantage. The walls of the buildings are cleaner than in Hanamura so they support climbing to vantage points, most noticeably the opening on the second floor in the upper right corner. The statue and the house behind it contain doors which offer cover suitable for quick ground movement.

There are some covers present in both locations for the defending team heroes to take cover in but due to the capture points being exposed, the odds of being overrun are great. In Hanamura the first point is located within the house to the left. Inside is an open space with bare walls and multiple entering points. In Kings Row defenders are pushed to the walls of the building behind the trees and car, leaving them out in the open if they wish to hold it. There are options to cover it from afar but this leaves the point open to be captured if there are no defenders on site. These points are located a short distance from the attacking teams spawnpoints which are placed beyond the walls in both maps, whereas defenders must traverse the entire map to reach it. Because of these facts attackers have the advantage on capturing it early on.

This advantage disappears when the attacking team reaches the second objective point. Hanamura’s (see Figure 6) second point is indoors, now openly exposed in the middle of the room. The layout of the room and the lack of cover forces the heroes to move close to the center, leaving them exposed to defenders on either side. There are three entrances leading straight to the middle and two more on each side of the capture points, all converging toward the middle. To the avatar’s left, there are stairs visibly connected to a plateau which goes along sides and ends where the avatar is standing. The porch has pillars, like those directly opposite of the avatar, surrounding it and granting protection to defending players. Now the attacking team must traverse the entire map whereas the defending team’s spawnpoint is in an adjacent room behind the avatar. Because of this, the defending team has the advantage on protecting the objective.
It is the same in King’s Row (see Figure 7) where there is a narrow, crooked path containing multiple smaller rooms leading up to the second objective. This gives defending heroes the possibility to set up hidden defenses. To the left of the avatar there are concealed plateaus, surrounding the objective point. Defending low mobility heroes has the advantage as players are forced into the same space, restricting agile high and medium mobility heroes.
One factor which differs in King’s Row compared to Hanamura is the second objective which is transporting a vehicle (the car seen *Figure 6*) onto the platform. In order to transport the car, players must be near it. This restricts high and medium mobility heroes on the attacking team but favors high and medium mobility heroes on the defending team since their abilities allow them to outmaneuver the heroes transporting the car and launch surprise attacks from various vantage points. Such vantage points include the roof directly opposing the avatar as well the smaller room on its right.

A third example of this level design is the Volskaya Industries map (see *Figure 8*). As in the previous two maps the map’s first objective point is an open area located outside. A short distance away is the attacking team’s spawnpoint which is located inside the building past the wall in the right-side corner. The map’s second objective point is located inside, with various smaller rooms and passages surrounding it. What differs between Volskaya Industries and the previous two maps is the fact that this level caters to all mobility categories. High mobility heroes can make use of the smooth walls and various entrance points without risking to much exposure. Medium mobility heroes can use their abilities to reach the same places high mobility heroes as well make us of the open skies, passages and rooms to move around the map.

Low mobility heroes are offered the same routes as other heroes since the same openings and possibilities of cover exist on all levels. Closed-in openings at ground-level offer protection from other low mobility heroes as well as offering cover against flying heroes. Open areas on the second floors are accessible to various heroes and while they offer high vantage points, those points leave the heroes exposed due to a lack of cover options.

*Figure 8: In-game screenshots taken from the Volskaya Industries map, Overwatch. First objective point (left) and second objective (right). Both points are the square areas in front of the avatar.*
In these three maps, the game’s designers have catered to all three mobility types as players can choose to traverse these levels in various ways. Their layout provides players with alternative passages and invites them to explore them to reach new vantage points. There is a shifting advantage between the teams where attackers benefit from being aggressive early on while defenders must be tactical. These early parts are also more suited for medium/high mobility heroes. The later parts of the maps tend to favor the defending team and low mobility heroes.

The levels facilitate this by having the first stage of the map be an open environment which, as the attacking team advances, narrows down. In coherence with how the distance of each team’s spawnpoint changes so does the time required for each team’s heroes to respawn and reach the rest of their team.

6.2. Doom

_Doom_ is a single player action first person shooter game developed and released by id Software in 2016. The game takes place in the distant future set within a research facility based on Mars, with the player taking on the role of Doom-guy. A space marine who at the start of the game is released and awoken from a deep slumber. He is then forced to take up arms and fight back the forces of hell which have overtaken the facility. Within the first minute of gameplay the player has been given a weapon, defeated three enemies and are on their way out of the tutorial level in search of more weapons and enemies to vanquish.

Without any real explanation to who the doom-guy is or what his mission is, players are sent out into a demon-infested facility.

In an interview (Takahashi 2016), Stratton explains that the reason for such a short introduction was that players did not play _Doom_ (2016) for its story. “They come to kill demons and blow stuff up…The Doom marine wakes up and he’s not there to do anything but kill demons. That’s what we feel is the player’s expectation.” Stratton also explains that for players who are interested in knowing more about the protagonist and/or the facility they can do so, it just will not be forced upon them. The game’s focus is making combat choices, not story choices.

6.2.1. Avatar Mobility

The Doom-guy is a character with high mobility which comes down to his speed. In the same interview Stratton says “You generally move faster, or as fast, as the enemies. Weaving your way through them, using your movement as a means of defense is a big part.” This connects back to their design principle of ‘Make me think, make me move.’ The developers designed all combat to be fast-paced. Projectiles and enemies are fast and they traverse the levels quickly and precisely to match the player’s speed but never outrun him. The developers strived to make sure most of the threats and incoming projectiles are visible to the player.

Apart from his speed the Doom-guy can mantle over obstacles, climb over edges and later gains the ability to double jump. As the player is faster than most enemies, they can jump across rifts as well as jump up unto ledges and climb up to plateaus, they can avoid engaging in close-combat, unless they want to. The developers have also removed slowdown features such as reloading, aiming to gain accuracy and regenerating health. They have also diminished the impact of fall damage by giving the Doom-guy impact compensation within
his armor, meaning as long as players do not fall from too great height they take none or minimal damage.

This encourages the player to take more risks in attempting to reach additional areas or alternatively try to take shortcuts and jump straight down instead of trying to find a route leading downwards. Weapons have automatic reloading systems so players do not have to think about stop fighting or pausing to reload, they can keep running and shooting. Movement does not affect the aiming system, meaning there are no drawbacks for the player keep traversing the level as well as no need to use a weapon’s aim sights as the weapon’s accuracy will always be the same. This means players will not need to stop, aim, fire and then reload to secure a kill, they can keep weaving around enemies during fights.

Lost health does not regenerate, meaning players must continue moving to replenish their health. Health can be restored by either finding medical packs placed around the levels or physically interacting with enemies as they drop minor health packs when they die. Doom-guy can also “Glory Kill” weakened enemies, which results in a bigger drop of health packs as well ammunition packs. To use this ability the player must stand next to enemies, which implies a risk-rewarding trade-off as enemies come in packs and are closely spaced. With all these abilities and speed, the Doom-guy is a highly versatile character who can, depending on the player’s expertise, move through environmental hindrances with ease throughout the levels.

6.2.2. Level Layout

The Doom-guy is already equipped with his armor, granting full movement speed and climbing capability when players enter the first level layout after a short tutorial. This means players have not acquired the double jump ability yet, which shows in the level layout. This eases players into learning and exploring the Doom-guy’s abilities.

Figure nine displays an overlooking view of the game’s first outdoor level and signals the start of the game at the end of the tutorial. On the ground below the avatar in Figure 9 is a plateau with two routes up to it. Players can either choose the road on the left and walk or jump onto the containers on the right. The developers have also placed an armor upgrade onto the middle plateau, inviting players to test their jump abilities. The drop down is also to establish their fall compensation.
This continues as the level progresses, as seen in Figure 10, more verticality is added and players now must be comfortable with climbing and jumping between platforms. The level layout becomes more puzzle-orientated at this point. Players are given multiple options for getting up onto the platform above the avatar. Players can use the boxes to the right, try scaling the pipes in front of them or go left and search for another solution. At this point they should already be familiar with the capabilities of the Doom-guy’s speed and jump distance otherwise they are learning it here.

Figure 9: In-game screenshot taken overlooking the first outdoor level after the tutorial, Doom.

Figure 10: In-game screenshot taken near the end of the first location, Doom.
So far jumping and exploring has been risk free, apart from enemies within the level, there have not been any environmental drawbacks to failing a jump. The layout of previous areas allows players to practice and take chances to learn their avatar’s limitations. So, as players reach the Foundry (see Figure 11) and they are introduced to the game’s first environmental danger, not counting holes or rifts in the ground alternatively falling outside the levels boundary.

![Figure 11: In-game screenshot taken from the Foundry, the game’s third location, Doom.](image)

Throughout this area there are rooms and patches with flowing lava, which deals massive damage to players falling into them, often resulting in a quick death for the Doom-guy. Together with this added environmental danger and the small platforms the player has to navigate, the number of enemies have also been ramped up. This layout requires players to be on the alert as well as for incoming enemies as well requiring them to calculate how to traverse and which platforms to jump onto. Players must avoid both falling into lava and getting trapped on a platform where they become an easy target for enemies.

This is the last new experience players need to take into account before they gain the double jump ability. Up to this point the levels have taught players to run and as Stratton stated it, weave around enemies using their speed. Then the levels gradually challenged the players with climbing and jumping between various platforms and openings. Then finally the jump mechanic was intertwined deeper into weaving through packs of enemies, all while becoming more comfortable with combat and traversing.

Once players have gained the ability to double jump, levels change as distances increase and various alternative objects appear in the levels, functioning as springboards. These springboards offer new paths and more verticality as players progress further. In Figure 12 players have now been sent to hell to do battle. With all their mobility features at their disposal, they can use the Doom-guy to his full potential. In this layout, there are pillars in the middle which can be reached with the double jump ability. Following the pillars or by using double jump again in combination with sprinting and climbing edges this area is transformed into a free-flowing arena for the Doom-guy.
Players can choose to weave through enemies on one platform before using the pillars to gain access to another platform. They can also drop down beneath and traverse around the pillars before they jump up and climb over any of the edges surrounding them. The level layout offers various options for how players can combat enemies without getting stuck and it is this playstyle the game now adapts for the rest of its duration.

Figure 12: In-game screenshot taken from the sixth location, Kadingir Sanctum, Doom.

This is not only seen in hell but also in the later facility areas back on Mars, especially as Figure 13 shows. This level offers the same free-flowing possibilities, as players can now jump between plateaus, visually distinguished with red and yellow. Players can also drop down and traverse around or through open crates, climb up on or jump between them and jump back up onto plateaus to keep moving between them. The double jump has increased the Doom-guy’s already high mobility and opened levels to further exploration and made the levels themselves into a tool for the player to learn.
Figure 13: In-game screenshot taken from the ninth location, Lazarus Labs, Doom.
7. Analysis

This chapter is an analysis of flow within *Doom* (2016) and *Overwatch* (2016). Each game’s levels are broken down into the categories established in Chapter 5.2.

7.1. Overwatch (2016)

Below follows an examination of *Overwatch*’s levels to determine how they facilitate flow.

7.1.1. Environment

By studying the architecture, objects, marking and visuals in Hanamura (see Figure 14) it is determined that this level primarily uses objects as well as lights to guide players. This view is the first players on the attacking team see, with five locations where the environment draws the players’ attention. From left to right, the first circle shows traffic signs where one is an arrow pointed inwards toward the street and the other is a warning sign placed above the arrow in such a way that it lets players notice it first and then the arrow. The second two circles show traffic lights which are natural objects for people to look towards while traveling. Below the middle traffic light is a huge wooden door with an emblem upon it, marking its importance and letting the attacking team players know they are targeting an area of importance. The last two bubbles contain a parked car and a restaurant icon, displaying a humanoid creature. What makes them noticeable are their size and recognizability. They are both facing toward the street, same as the arrow sign and them being relatable objects with a clear front and back end, makes them natural arrows.

*Figure 14: In-game screenshot taken outside the attacking team’s spawnpoint on the Hanamura map, Overwatch. White circles indicate environmental elements.*
The house provides a two-way split but the path on the right side is almost concealed by what looks to be a small crane apparatus, as well as being concealed in shadow by the surrounding houses. The left path meanwhile is partly lit by the sun as well as containing several objects forming directional signs, guiding players toward this path. Outside the defenders’ spawnpoint (see Figure 15) there are less objects but instead light which indicates which way players could take or where potential enemies might enter from. Both circles on the left show dim lights near door openings while the circles on the right show glimpses of a large cherry blossom tree. These two circles are also placed near the massive sunlight shining in from the roof, which subconsciously draws the players attention if only for a moment so the next objects they see are the cherry tree’s pink color and the three openings leading out.

Figure 15: In-game screenshot taken outside the defending team’s spawnpoint on the Hanamura map, Overwatch. White circles indicate environmental elements.

King’s Row (see Figure 16) also uses lights to guide its defending players outward and luring the attacking team inward. The first object both teams see as they enter is the large orange lamp hanging from the ceiling. With its bright light and size, it points out a place of importance. The dark orange lights along the floor show the path and like the large lamp signals importance, the floor lights invite players to follow them. The blue lights inside the rooms set a cold, rather saddening tone, making them less inviting to follow.

The start zone of the attacking team on King’s Row (see Figure 17) uses light and the architecture to guide the players. The lights within the left circles start at street level and slowly move diagonally upward and inward to the screen center, almost blending in with the roof above. The roof is pointing diagonally downwards into the middle, in the same manner as the bus in front of the avatar and theater sign on the right do. These guide the player’s vision toward the middle and into the large, blue lit tower, hovering behind the bus which seems to hold an open area for players to explore.
**Figure 16:** In-game screenshot taken outside the defending team’s spawnpoint on the Kings Row map, Overwatch. White circles indicate environmental elements.

**Figure 17:** In-game screenshot taken outside the attacking team’s spawnpoint on the Kings Row map, Overwatch. White circles and arrows indicate environmental elements.
Both the attacking and defending teams’ spawnpoints in Volskaya industries (see Figure 18) use lights and buildings to create directional arrows. The lights catch the players’ attention and guide them as the building points downward into the center of the screen where a light blue light indicates that the map continues further in that direction. In these maps, the sides surrounding the critical path are purposefully made dull and important by comparison to funnel players toward certain areas. These elements guide both teams, pulling both the defending and the attacking team inward.

Figure 18: In-game screenshot outside attacking (left) and defending (right) teams spawnpoint on the Volskaya Industries map, Overwatch. White circles and arrows indicate environmental elements.

7.1.2. Flow

So, do these level design elements found within these three levels support flow?

- Clear directional goals?
  - Yes, as players traverse the level, elements within the level keep telegraphing to the players where the next objective lies and which path leads them toward it. The layouts contain plenty of open space in the first half and narrows down around the second objective where the players are guided more strictly.

- Skill vs obstacle?
  - Yes, each hero, regardless of their mobility category are shown available routes and these are visible as players approach them. Players must not stop and search for a way in as the open level design is clearly guiding them. While there is a main road to any objective, there are always various alternative routes if players control a hero with more mobility.

- Clear feedback?
  - Yes, every important building, object and sign are created so they can always be spotted and reached if possible. All heroes have passages they can take and
if the player knows the limitations of their hero they do not need to wonder if they can reach them, unless they are looking for more original routes.

7.1.3. Design Principles

*Overwatch* has an avatar based gameplay where the player’s expertise and control over their hero determine their success in each match. It also has a level design which allows for all three mobility types to traverse in more ways than one. Its visual design makes it easy to tell what can be interacted with and which paths lead where. Based upon this analysis it can be said that *Overwatch* has successfully achieved their initial design goals.

7.2. Doom (2016)

Below follows an examination of *Doom*’s levels to determine how they facilitate flow.

7.2.1. Environment

By studying the architecture, objects, markings and visuals of the levels in *Doom* it can be concluded that there are repeating objects, markings and visuals throughout the game which serve as guiding tools. There is a lack of architectural visual guiding however which does not seem to return past its initial use in the first level (see Figure 19). In the first level the entire background forms arrows which all point toward the left and while it can not be seen, even the wind is blowing hard toward the left. This is an example of a large-scale directional arrow but similar examples can not be found past this instance. Instead the game keeps using markings, visuals and some objects to guide the player.

*Figure 19: In-game screenshot taken overlooking the first outdoor level after the tutorial, Doom. White circles indicate environmental elements.*
The circle to the left in *Figure 20* displays which type of color card the player needs to open a specific door. As the game has just begun and players have not acquired any objects apart from their weapons, they have to look for additional help. The green lights in the middle and on the right side indicate alternative paths. Since the one above the door cannot be accessed without opening it, the players are naturally guided toward the light inside the cave. Second one is placed within the cavern leading inwards. This light is an object which will continue to appear throughout the game, particularly in a green color. The color green represents a universal go sign, traffic lights being a good example.

*Figure 20*: In-game screenshot taken just pass figure 19, *Doom*. White circles indicate environmental elements.

The green light appears in the distance of the Kadingir Sanctum (see *Figure 21*) within hell, located up toward the right corner. In this example players are guided partly by this green light as well as by the large, partially hidden red light in the top middle section of the screen. This red light has now become a large environmental guidance tool instead of the architectural structures seen in *Figure 19*. The most repeating types of guiding tools are malfunctioning doors, markings such as blood or strong, red lights.
On the floor in the left image (see Figure 22) is blood which has been smeared and splattered around and it leaves a trail leading into the door just above the left circle. Following it sends players down various paths, even though it looks like it cuts off sometimes, noticeably below the circle on the right. The blood trail leads the player to a dead scientist (see the small top end of the right circle), who holds a key for the player to pick up.

The developers have added another element onto this (see Figure 23), where the blood is leading up to what seems to be a broken door with a small opening in it. Since players have previously learned that following trails of blood is rewarding, they are now invited to walk up and inspect the door. Upon doing so, players notice that they can interact with it and even open it, which teaches players to be on the lookout for another object in the environment.
Figure 22: In-game screenshot taken from the second location, Resource Operations, Doom. White circles indicate environmental elements.

Lastly, the levels have spots of bright white light (see Figure 24) which become very distinct against the otherwise dark and gritty environment. The lights clearly establish a point of interest, becoming a liberating point in the darkness which otherwise seems to cover the avatar completely. Once the player reaches this area they notice a door opening ahead (see to the right side of the light), leading them onwards. It is not always spotlights as in this example, other examples include burning fires, noticeable in Figure 19 and as well as in Figure 21. Apart from variations of these elements there really are not any other signs or markings that guide players as they traverse the levels.

This is to Doom’s advantage, as the game is fast paced and players need to be moving constantly, they cannot afford to focus on a huge variety of elements in the environment. The environments instead have certain key elements which has been shown earlier without the interference of enemies. The distinctiveness of these elements makes them excellent for fast reading as players weave around the level combating enemies. This allows players to spend their decision-making time on how to most efficiently eliminate the enemies. As Stratton stated (Takahashi 2016), that is the purpose of the game and this playstyle.
Figure 23: In-game screenshot taken from the second location, Resource Operations, Doom. White circles indicate environmental elements.

Figure 24: In-game screenshot taken from the second location, Resource Operations, Doom. White circles indicate environmental elements.
7.2.2. Flow

So, do the level design elements found within these three levels support flow?

- Clear directional goals?
  - Yes, as players traverse the level it keeps telegraphing where the next objective lies and which path leads them towards it. *Doom* has an integrated tracking system which always points players in the right direction. Although given the other directional elements, players can afford to discard it since the environment is telegraphing where to go next.

- Skill vs obstacle?
  - Yes, Doom-guy’s high mobility and the level layout are both formed to cater his abilities. Players can keep moving as the level design is clearly guiding them. There is always a main road to any objective, but there are also some alternative routes if the players have explored enough of the area. All level obstacles such as ledges or plateaus are catered to the Doom-guy’s current capabilities. Before the player gains the double jump, there are no places displaying a need of this ability. Once they have it however, levels are designed to make the most use out of it.

- Clear feedback?
  - Yes, every ledge, every plateau is reachable when they need to be. Meaning there are not any luring players to take a chance, as the players are informed of what exists and how to access it the moment they enter an area.

7.2.3. Design Principles

*Doom* has, based upon this analysis achieved their initial design principles and created a style of gameplay which is based on the speed of their avatar and the player’s ability to control and make use of it. Their level design caters to the agile player who uses the Doom-guy to nimbly weave around groups of enemies, taking them out as they are passing by. It is also suitable for players who rather take their time and deal with them from a distance or slowly approach them using the environment as cover. It is up to the player to decide how their Doom-guy best deals with the forces of hell. Its darker, gritty, graphical design is well executed, using classic sci-fi elements such as tiny lights around ledges and pipes to connect platforms. Giving clear indication of what can be interacted with and what can not. In hell, the red, rocky environment clearly displays which plateaus are reachable and which are not, as well as where the path goes and if it is accessible even during intense combat.
8. Reflections

The purpose of this thesis is to examine level design to determine what within the design enables flow. First off, this is a broad topic addressing the subject of level design which by itself lacks a unified meaning. The meaning of level design changes depending on developers and genre and most have their own level design principles. Even flow has a different meaning and implementation, depending on the genre and intention of the game. However, there are commonly used principles and a vocabulary which helps game developers in different genres to find common ground.

Looking at Doom (2016) and Overwatch (2016), despite their similarities the dramatic curve in both games differs a great deal. This is partially due to the size of their maps. Overwatch (2016) has short maps made for bursts of gameplay with certain points focusing on combat. In Doom (2016) levels are longer, contain more content and most areas are a mixture of combat and travel area.

Leaving their different artstyle aside and focusing on key elements, they can be broken down into the same objects and elements. Looking at these elements as basic building blocks there are lights and arrows. Regardless of their size and aesthetics, the leaning buildings in Overwatch (2016) and the pools of blood in Doom (2016) fill the same function. Street lights or fires, they are given a meaning once they have aesthetics which are in coherence with the overall environment. Objects found in one game would become immersion-breaking if put into the other.

The games use the same building blocks, just re-skinned to suit their own game’s aesthetic. This brings into focus how much of the flow in the games is dependent upon the assets graphical styles as well as their location. Compare the environment outside of both teams spawning points in Volskaya Industries with the first outdoor level the Doom-guy experiences. Both contain environmental elements (houses in Overwatch (2016), mountains in Doom (2016)), that are leaning toward the left.

Even replacing their narrative-specific models and textures and replacing them with untextured primitive objects, these elements would still point players in the right direction. The same principles applies to the lights, as the value contrast they provide would still catch the players’ attention.

However disguising them in appropriate graphics feeds into the overall immersion of the game, making them fulfill their purpose and enabling flow. Both these games have succeeded in creating aesthetically appropriate elements for each map which serve to subconsciously guide players.
9. Conclusion

Immersive gameplay is vital to all aspects of game design but how do developers design gameplay which causes the least amount of immersion breakage. How is level design affected by the playable characters’ abilities to maneuver and interact with the environment within the level? If a player’s abilities to explore and traverse are being hindered, or if their current abilities are inadequate to overcome the challenges they face, the players risk losing immersion in the game. So, how are levels designed to reduce this?

To conclude, the elements found in these games facilitating flow are simple elements of light and direction. Simple in this case means basic building blocks which have been created, with a specific function in mind for a specific location. Dark areas exist to enhance spots of light and make them more alluring for players. The lights are then placed and given specific colors and intensities to create a specific feeling. Each opening has a specific purpose, either to create a vantage point for the player or lead to an alternative path.

In *Doom* (2016) levels have an open layout with clean passages and rooms for the player to cross without risking jumping or running into hindrances. The various plateaus and platforms in the level are adjusted to always be within reach for a quick sprint or a timed jump. The player’s mobility is always enhanced by the environment and the environment is created to let them know where dangers are coming from and where they should go to avoid or face them. The combat is key to this game and the levels with all their elements serve to enhance it.

In *Overwatch* (2016) levels are changing as they progress to cater to the various heroes and their different mobilities. All heroes can always find a route best suited for their hero, either by using an alternative path to reach objectives or finding an area where their hero’s abilities offer them an advantage over those of the enemy team. Ability-based gameplay is the key to this game and the levels does nothing but enhances this.
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Appendix

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