

A Framework for Analyzing Playability Requirements based on Game Reviews

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Requirements Engineering is an important phase in software development. Game development also requires Requirement Engineering, due to the frequently changes of requirements during the process of the game development [Kasurinen et al., 2014]. However, only a few studies have linked the game development and Requirements Engineering together. Research in related fields is inadequate and needs to be studied in depth

Playability is a crucial concept for the game study. For a player, playability is highly related to the player experience, especially the experience of enjoyment. For a video game, the quality of game components affects the degree of playability. Playability is often used for evaluating the video game, but studies focus on playability are insufficient [Korhonen, 2016, p21]. Moreover, few researchers study playability from the perspective of Requirement Engineering. This thesis supposes playability as a kind of non-functional requirements that is important for the game development. The aim of the thesis is to help game designers or testers understand and analyse playability requirements systematically.

The thesis work includes two parts, literature review and data analysis. Literature referred to playability, game components and game enjoyment was mainly studied. Based on the literature review, 41 game reviews from GameSpot were collected and analysed by grounded theory. As a result, Playability Framework was developed for understanding and analyzing playability requirements. There are three categories of playability, including Gameplay, Representation and Story. This thesis focuses on Gameplay, since most of data belongs to Gameplay. Furthermore, four elements of Gameplay were concluded, including Goals, Gameworld, Avatar and Player. Through analysing the relationships between the four elements, Gameplay are categorized into three groups, Achievements of goals, Game interaction and Game control. In addition, five attributes that highly affect the quality of gameplay were found during the data analysis, they are Variety, Meaningfulness, Fairness, Pace and Intuitiveness. Based on the framework, the steps of analysing player requirements and the form of playability requirements were also

proposed. The result of the thesis can help game designers and testers transfer playability issues into playability requirements, so that the issues can be analyzed and tracked systematically.

Key words and terms: Requirements engineering, Playability, Game development, Game reviews, Grounded theory

Contents

1. Introduction.....	1
2. Playability as a non-functional requirement.....	3
2.1. Introduction of non-functional requirements	3
2.2. What is the playability?.....	4
3. Game components related to playability	6
3.1. Gameplay.....	7
3.2. Game mechanics.....	9
3.3. User interface	10
3.4. Game story and narrative	10
3.5. Audio-visual presentation.....	11
4. Enjoyment as the core player’s experience in a video game.....	13
4.1. Flow.....	13
4.2. Immersion.....	17
5. Game reviews	20
6. Grounded theory.....	23
6.1. Game reviews for this research	24
6.2. Coding and memo-writing.....	27
6.3. Theoretical sampling	29
7. Playability Framework.....	33
7.1. Categories of playability	33
7.1.1. Gameplay.....	33
7.1.2. Representation and Story.....	34
7.2. Attributes of playability requirements.....	35
7.2.1. Variety	35
7.2.2. Meaningfulness.....	37
7.2.3. Fairness.....	38
7.2.4. Pace.....	40
7.2.5. Intuitiveness.....	41
8. Discussion	43
9. Conclusion	46
References.....	47
Appendix 1_Game list	52
Appendix 2_Line by line coding	54
Appendix 3_Memo-writing	61
Appendix 4_Theoretical sampling.....	71

1. Introduction

The industry of video games has become one of the fastest growing businesses in the world. According to the 2015 Global Games Market Report from Newzoo [2015], global games market jumped to \$91.5Bn with an increase of 9.4 percent in 2015. The researchers have predicted that global revenues of video games will reach \$107Bn in 2017. On the other hand, the flooded market also results a huge number of failed games.

Requirements Engineering (RE) is one of the most important phase in software development. It refers to the process of discovering, documenting, and maintaining a set of requirements for a computer-based system [Sommerville and Kotonya, 1998]. Game development also requires an understanding of users, their expectations and requirements. Game products are evolving based on players' feedback, there might be a significant difference between the initial design and the final product [Kasurinen et al., 2014]. Hence, Requirements Engineering is also important for the game development.

Video games belong to a type of entertainment products, instead of focusing on the utilitarian aspect, video games shall provide enjoyable experience to players. Playability is a crucial concept for the video game, it can be understood as the degree to which a game is fun to play. Based on playability, some sets of heuristics were developed for evaluating the video game. However, the term playability is rarely used for the game development. Few researchers study the concept of playability from the perspective of RE.

In terms of requirements engineering, it forms a kind of non-functional requirements that focus on the quality attribute of a game. In order to capture and analyse the requirements related to playability, game development is highly dependent on constant user testing, such as surveys, usability testing and playtest. Although game designers pay high attention to playability, there is a lack of analysis and management for non-functional requirements related to playability during the constant user testing. Player feedback from the user testing is rarely documented formally and translated into the form of requirements [Kasurinen et al., 2014]. Translating player feedback on playability into the form of non-functional requirements can benefit requirements analysis in game development.

This study aims to develop a framework that analyzes and manages player feedback on playability in the form of non-functional requirements. To achieve this goal, player feedback of video games needs to be collected and analyzed. Game reviews from GameSpot website [GameSpot, 2016] were selected as the research data. The reviews are written by professional reviewers with extensive experience in this field. They contain rich and detailed information about game experience and the quality of the game, which benefit to the data analysis. GameSpot is a commercial media, reviews from it might be biased due to the personal preference and the commercial value. In order to deal with this issue, general high score games were considered as the suitable research scope. And these games are also liked by most players and other reviewers from other media. Unreasonable views for the games would be less than others. In addition, there are numerous types of video games, analyzing game reviews related to all types of video games would be too ambitious. Thus, the single player action PC game was selected as the target of this study. The action game is a super-genre that

covers features of other game genres, such as role-playing games and strategy games [Adams, 2009]. Analyzing reviews of action games can lead to concrete results.

Game reviews contain rich and detailed information about the personal experience and thought of a game. Analyzing them is a qualitative and empirical research. To conduct this research, grounded theory is applied. It is a general methodology and a way of developing a theory from empirical research [Glaser, 1967]. It provides systematic procedures for checking, refining and developing theory from rich qualitative materials [Smith et al., 1995]. In the grounded theory, data are collected and analyzed simultaneously. The initial theory can be modified or elaborated according to the incoming data [Corbin and Strauss, 1990]. The more the data is collected, the deeper the analysis is conducted. The grounded theory is suitable for this study, due to the qualitative research, empirical materials (game reviews) and the aim of developing an undefined framework.

The concept of playability has been studied by a few researchers. Sánchez et al. [2012] define a series of properties and attributes for playability and use them to evaluate player experience in the video game. Järvinen et al. [2002] study playability as an evaluation tool that can be used to evaluate the quality of game product. In addition, some researchers [Desurvire et al., 2004; Korhonen and Koivisto, 2006] also apply the concept of playability to studies of heuristic evaluation. Accordingly, most of studies about playability focus on game evaluation or guidelines for game design. However, playability as a type of non-functional requirements is barely discussed. There is a gap between the concept of playability and requirement engineering in game development. The requirements related to playability can be managed and analyzed more systematically. The result of this study clarifies the concept of playability as a type of non-functional requirements, and help game designers or testers analyze and manage playability requirements systematically. Consequently, this research can help game designers or testers analyze and manage the player feedback on playability in the form of non-functional requirements

2. Playability as a non-functional requirement

2.1. Introduction of non-functional requirements

Although the term ‘non-functional requirements’ (NFR) has been used for more than 20 years, there is no consensus on its definition in the requirements engineering community [Glinz, 2007]. Informally, most NFRs have been represented as “-ilities” (e.g., usability) or “-ities” (e.g, integrity). A few NFRs also do not end with “-ility” or “-ity”, like performance, cost or coherence. [Chung et al., 2009]

Through summarizing and comparing a set of definitions of NFR, Martin Glinz [2007] argues that there is lack of consensus about the concept of NFR. The variety of mixed concepts leads misunderstanding on non-functional requirements. In order to offer a common understanding on non-functional requirements, Glinz defines and classifies non-functional requirements based on the concept of concerns. “A concern is a matter of interest in a system” [Glinz, 2007, p24]. It could be a functional concern, a performance concern or a quality concern. Figure 1 [Glinz, 2007] shows a concern-based taxonomy of system requirements. The requirements are classified into three categories: functional requirement, attribute and constraint.

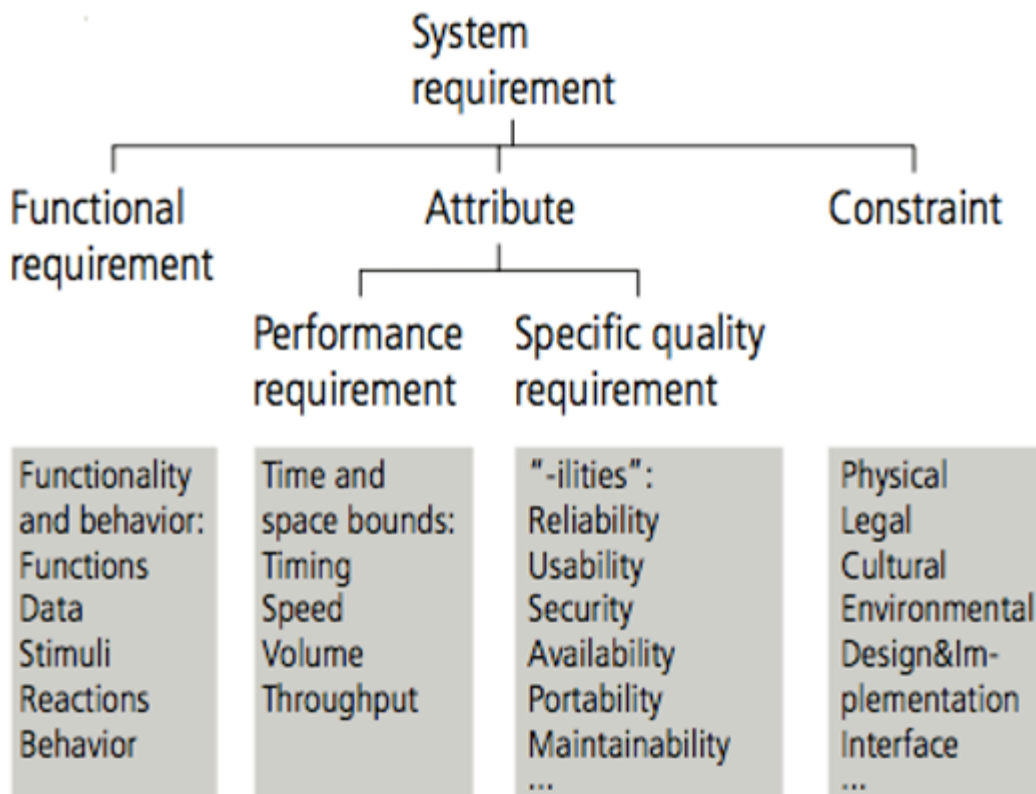


Figure 1. A concern-based taxonomy of requirements [Glinz, 2007]

Functional requirements represent requirements related to functions of a system. They concern “the expected behavior of a system or system component in terms of its reaction to given input stimuli and the functions and data required for processing the stimuli and producing the reaction” [Glinz, 2007, p24]. Functional requirements define “what the system must accomplish or must be able to do” [Bob, 2001, p43]. Attribute

are divided into performance requirement and specific quality requirement. Performance requirements concern the performance of a system. Performance can be considered as an attribute of a function, such as response time. It determines how well a system run. Performance is different with other attributes, since measuring performance is not difficult a priori and there is a broad consensus on it [Glinz, 2007], such as time and throughout. Specific quality requirement is “a requirement that pertains to a quality concern other than the quality of meeting the functional requirements” [Glinz, 2007, p24]. It defines capabilities, services and behavior of a system instead of a function, such as usability or security. Constraint represent a requirement that “constrains the solution space beyond what is necessary for meeting the given functional, performance and specific quality requirements” [Glinz, 2007, p24], such as physical constrains or culture constrains of a product. Among them, attribute and constraint are considered as non-functional requirements. Glinz’s study [2007] is important for understanding playability from perspective of non-functional requirements.

2.2. What is the playability?

Video games are “a special type of multimedia application – an entertainment product that requires active participation by the user” [Callele et al., 2005, p1]. A video game is comprised of many content forms, such as interactive content, audio, images, videos, and animations. The difference from other software is that only the game has gameplay. There is no consensus about the definition of gameplay. In general, gameplay defines the way of interactions between the player and the game. Challenges, game rules or players’ actions are all related to gameplay. Gameplay makes each game unique [Callele et al., 2005]. In addition, contrary to most software applications, video games are developed for entertainment rather than for the productivity, “no one is obliged to use a video game” [Alves et al., 2007, p275]. Entertainment is the core quality of the video game. In general, the entertainment of a video game usually comes from gameplay [Callele et al., 2005]. In addition to gameplay, other aspects such as audiovisual elements and game stories also contribute to the entertainment of a game. Playability can be seen as a specific quality requirement that concerns the entertainment of a video game.

Although there are a few studies about playability, there is a lack of common definition or understanding on playability. On the one hand, Playability is highly related to the player experience, especially the experience of enjoyment. Korhonen and Koivisto [2006] believe that the purpose of a game is to make players have fun. Alves et al. [2007] believe emotional attributes like fun or enjoyment are related to the core value of a game. Federoff [2002] considers players would not buy a game if the game is not fun to play. Sánchez et al. [2012] connect the player’s experience with the concept of playability. They believe playability can be indicated by a set of properties that describe the experience of player playing a video game, and the main objective of these properties is to offer enjoyment and entertainment. As a result, they define playability as “A set of properties that describe the player experience using a specific game system whose main objective is to provide enjoyment and entertainment, by being credible and satisfying, when the player plays alone or in company” [Sánchez et al., 2012].

On the other hand, the quality of game components also affects playability of a video game. Jarvinen [2012] considers playability as a quality measure of designing and

evaluating a video game. For game designing, playability can be considered as guidelines of designing different components of a game, such as gameplay. For game evaluating, playability is a series of criteria for evaluating gameplay or interaction of a game. whether it is for game designing or evaluating, gameplay is a main component referred to playability. Korhonen [2016, p35] defines playability as “A game has good playability when the user interface is intuitive and the gaming platform is unobtrusive, so that the player can concentrate on playing the game. Fun and challenge are created through gameplay when it is understandable, suitably difficult and engaging”. User interface, gameplay and game platform are three basic elements that form the concept of playability. Among them, game platform is not the component of a game, but it determines the context of playing. Desurvire et al. [2004] argues that playability is affected by many game components, such as basic interface, gameplay, game mechanics and game story. They also develop a set of heuristics for evaluating playability of games, but they do not give a further explanation about playability.

In the literature of game design, few studies focus on playability. There is no consensus among definitions of playability, and most of them are abstract and confused. The concept of playability needs to be studied deeply. Based on the analysis of previous definitions, playability can be understood and studied from two perspectives, the game and the player. From the game’s point of view, playability is affected by certain components of a video game, and the high quality of the components contribute to the positive experience of players. From the player’s point of view, the player experience indicates the degree of playability, and enjoyment is the main characteristic. In a word, the high playability game contributes to the player's enjoyment, and enjoyment partly indicate playability of a game. Combing with these two points of view, this study considers playability as the degree to which a game is enjoyable to play, and the degree is affected by certain components of a video game, such as gameplay and game story. In order to further understand the concept of playability, game components related to playability will be discussed in Chapter3 and Chapter 4 will analyze the core experience of the player in a video game, enjoyment.

3. Game components related to playability

Järvinen et al. [2002] break down playability into four aspects: functional playability, structural playability, audiovisual playability and social playability. These four aspects correspond to the different components of video games.

Functional playability relates to control mechanisms of the game. The control mechanism represents the way how a player uses a control peripheral to play the game. It can be understood from two aspects: the control peripheral and its connection with the game. First, there are different kinds of control peripherals, such as the game handle, the keyboard or the mouse. Different game controllers are used in different ways and in different contexts. Second, rules of control settings also influence the control mechanism. Rules of control settings define how players manipulate the controller to interact with the game. For example, in ordering to perform a jump action in the game, the player needs to click the space bar of the keyboard. The rules are like bonds between physical actions from the player and virtual behaviors in the game.

The structural playability is about patterns of a video game. Järvinen et al. [2002] believe patterns come from the interaction between the player and the game rules. For example, in a platform game, players usually need to manipulate the game character to cross different obstacles to win the game. In this situation, game rules define available motions of the game character, behaviors of different obstacles and conditions of victory. The player has to play the game based on the game rules. The interaction between different game rules and players' actions generate different game patterns, and game patterns form structures of a game. There are two types of structures, including micro-level structure and macro-level structure. The micro-level structure represents gameplay patterns. It emphasizes the process of the interaction. The macro-level structure can be considered as connection parts between gameplay patterns, such as briefings, cut-scenes, the background story, and the loading process, etc.

Audiovisual playability is about audiovisual elements of a game, such as the art style and graphic performance. It determines the audiovisual appearance of a game. For example, a 2D arcade game might tend to be a pixel art style with rock music. Social playability refers to the context of playing, player cultures and the player community. Although social elements are an important part for playability, this part is ignored in this study. This study focuses on the single player game.

Sánchez et al. [2012] also discuss the six facets of playability including intrinsic playability, mechanical playability, interactive playability, artistic playability, intrapersonal playability and interpersonal playability. Intrinsic playability is highly related to gameplay, it represents how a game present to the players. Game rules, goals and game mechanics are all belong to it. Mechanical playability is referred to quality of a video games from the perspective of software development. It is associated with techniques used in game development. Interactive playability is highly referred to user interface of a video game, including the basic interface and control mechanisms. Artistic playability is about artistic elements of a game, such as visual graphics, sound effects and stories. Intrapersonal playability relates to personal likes and feelings of players when they are playing a game. Interpersonal playability refers to social elements of a game, such as the group awareness, competitive or cooperative play.

Although the terms of using are different from the Järvinen et al. [2002], the content is similar. Sánchez et al. also mentions gameplay (Intrinsic playability), audiovisual elements (Artistic playability) and social elements (Interpersonal playability) of the game. On the other hand, there are a few differences from the Sánchez et al. For interactive playability, it relates to the user interface of a game. The user interface includes both control mechanisms and the interface (menu or head-up display). Artistic playability not only refers to the audiovisual elements, but contains the story elements of the game. In the study of Järvinen et al. [2002], the interface and story elements are concluded as the macro-level structure of structural playability. In addition, Sánchez et al. concern about technical factors of a game. They call them mechanical playability. Mechanical playability refers to the game engine that determine the implementation efficiency of a game from the perspective of software, such as graphic quality or fluency of the system. The personal likes of players are also counted into the consideration of playability by Sánchez et al., called intrapersonal playability.

Game components	Järvinen et al. [2002]	Sánchez et al. [2012]
Gameplay	Structural playability	Intrinsic playability
Game mechanics or game rules	Structural playability	Intrinsic playability
User interface (control mechanisms and interface)	Functional playability	Interactive playability
Game story and narrative	Structural playability	Artistic Playability
Audiovisuals	Audiovisual playability	Mechanical playability and Artistic Playability
Social elements	Social playability	Interpersonal Playability
Personal likes of players	N/A	Intrapersonal Playability

Table 1. A summary of playability aspects

According to studies from Järvinen et al. [2002] and Sánchez et al. [2002], we summarize seven aspects of playability, as shown in Table 1, including gameplay, game mechanics, user interface, audiovisuals, social elements and personal likes of players. Among them, social elements and personal likes of players are not considered in this study. Although social factors still exist in single player games, most of them are out of the game, such as player communities or achievement rankings. The personality of the player is the aspect of the player. In this study, playability is considered as a specific quality requirement for game development instead of player experience. In summary, five aspects of playability are concluded, including gameplay, game mechanics, user interface, game story and narrative, and audiovisuals. These five aspects can be seen as five design components of game development, and they form a video game. Next, these five components will be discussed in detail.

3.1. Gameplay

Gameplay is unique to the videogame. It is the “primary source of entertainment in all video games” [Adams, 2009, p19].

Fabricatore et al. [2007, p3] define gameplay as follow:

“A set of activities that can be performed by the player during the ludic experience, and by other entities belonging to the virtual world, as a response to player’s actions and/or as autonomous courses of action that contribute to the liveliness of the virtual world.”

This definition of gameplay emphasizes the interaction between the player and entities (e.g., buildings and enemies) in the virtual game world. For a player, it is about what the player can do and how other entities in the game respond to the player’s actions. For example, in most action games, a player can perform attack actions. When the player attacks an enemy in the game, the enemy react to the player’s attack. If the player hits the enemy, the enemy usually shows an act of being beaten. The enemy might bleed and enter the recovery state. Sometimes, the enemy also dodge the attack from the player. On the other hand, the entities also can perform actions autonomously and the player has to react by doing what is suitable for a particular scenario. For example, the enemy takes the initiative to attack the player when the player enters the combat zone. In this situation, the player needs to react to the enemy’s attack. This interaction between the player and entities in the game constitutes the gameplay.

In addition to Fabricatore et al. [2007], Adams [2009, p640] also proposes the definition of gameplay in his study about the game design as follow:

“The challenges presented to a player and the actions the player is permitted to take, both to overcome those challenges and to perform other enjoyable activities in the game world.”

Different from Fabricatore et al., Adams emphasizes the concept of challenges and enjoyable activities in the game world. Challenges can be seen as any task for the player that needs to be accomplished through a mental or physical effort. In order to accomplish a set of challenges, a player needs to perform certain actions. In addition to the challenges, there are enjoyable activities in the video game. For example, a few players like to change the appearance of the character in the video game. The process of changing the appearance is not a challenge, but it makes players have fun. In a word, the gameplay is about a process of the player in a video game overcome the challenges or participates enjoyable activities.

Comparing these two definitions, there is one understanding on gameplay in common: gameplay contains the game rules. Fabricatore et al. [2007] believe there must be activities that can be performed by the player and other entities in the game. Adams [2009] believes gameplay should specify the actions that the player is permitted to take. Both of these two arguments imply that gameplay provides the game rules. The game rules define what challenges or activities are and what the player and entities in the game can do.

According to the analysis of these two definitions, gameplay consists of three elements, including challenges or enjoyable activities, the interaction and the game rules. In order to complete challenges or enjoyable activates of the game, the player needs to control the avatar to interact with other entities in the game world. The term avatar means entities the player controls directly in the game. This whole process should be performed according to the game rules. In conclusion, gameplay can be defined as: according to the game rules, the player completes a series of challenges or enjoyable activities through interacting with the game world.

3.2. Game mechanics

Game mechanics are tools that support gameplay [Fabricatore et al., 2007]. It defines conditions of achieving the goals in the game and rules of interactions between a player and the virtual game world. From the player’s point of view, game mechanics are black boxes that can be visible or invisible [Fabricatore et al., 2007]. As shown in Figure 2, they receive the input from the player and change the status of the avatar and related entities in the game world. The result of the change, i.e. the output can continue interacting with other game mechanics. Taking a combat process in a game as an example (see Figure 3), suppose there are two attack options for the player, including smash and overhead smash with 10 and 20 damages respectively. The enemy has total 50 points of the health without any armors. If a player uses the controller to perform a smash action, this command as an input is sent to game mechanics of the avatar. Then, the avatar performs a smash attack according to the player’s input. Game mechanics of combat judge if this attack hits the enemy. If the attack hits the enemy, game mechanics of the enemy will identify the attack type, and lost 10 points of the health. Although this example is simpler than the combat process in the real game, it explains what game mechanics are. As Adams [2009, p286] said:

“The core mechanics consist of the data and the algorithms that precisely define the game’s rules and internal operations.”

Game mechanics can be considered as the heart of the game that build the gameplay.

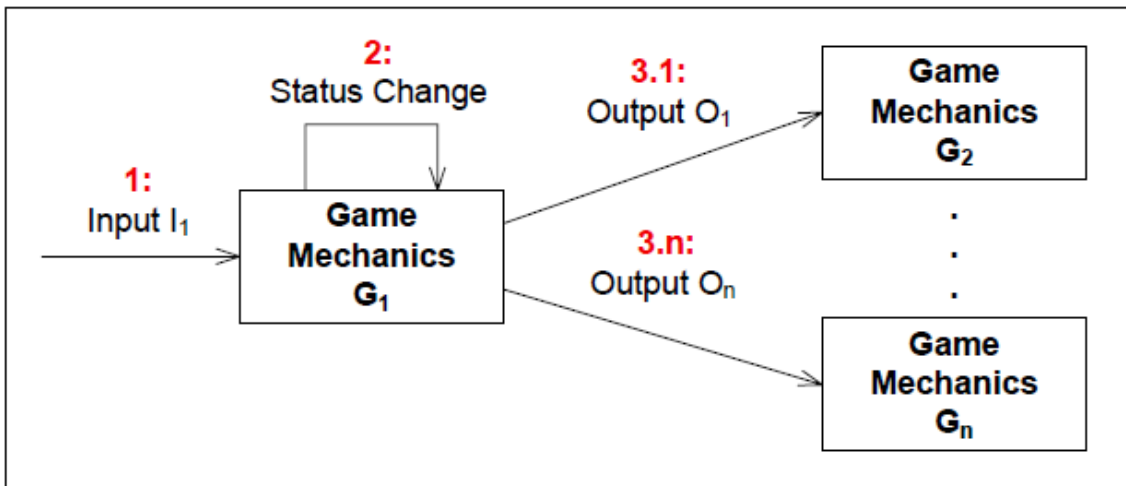


Figure 2. Game mechanics as black boxes [Fabricatore et al., 2007]

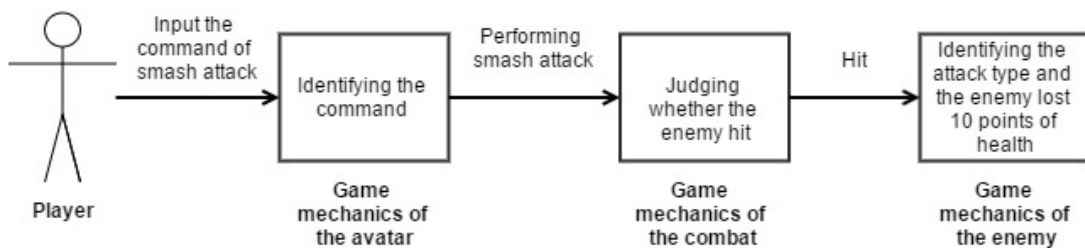


Figure 3. Game mechanics in the process of the combat

3.3. User interface

The user interface is “the collection of presentation elements and control elements that mediate between the player in the real world and the game world” Adams [2009, p650].

Figure 4 shows how the user interface works between a player and a game. The flow from a player to the physical input and to the virtual interface or world is the process of the control. It turns the manipulation of the player upon the input hardware (i.e. controller, mouse and keyboard) into the actions in the game world or virtual interface. Based on the actions from the player, the game world or virtual interface transfer the result to the physical output in the form of visual and audio. Then, the player can receive the information from the physical output. This process is conducted through the user interface. Except for the player and the game world, there is another layer called virtual interface, as shown in Figure 4. The virtual interface represents the thing that are not part of the game world but belong to the game, such as virtual buttons, sliders, displays and menus [Schell, 2014]. Although these elements cannot affect the game world, they support the player to play the game. For example, the HUD (head-up display) is a virtual interface of the game. It shows the state of the character and the game world in the video game, such as health, time, ammunition or mini-map, and facilitates the player in game playing.

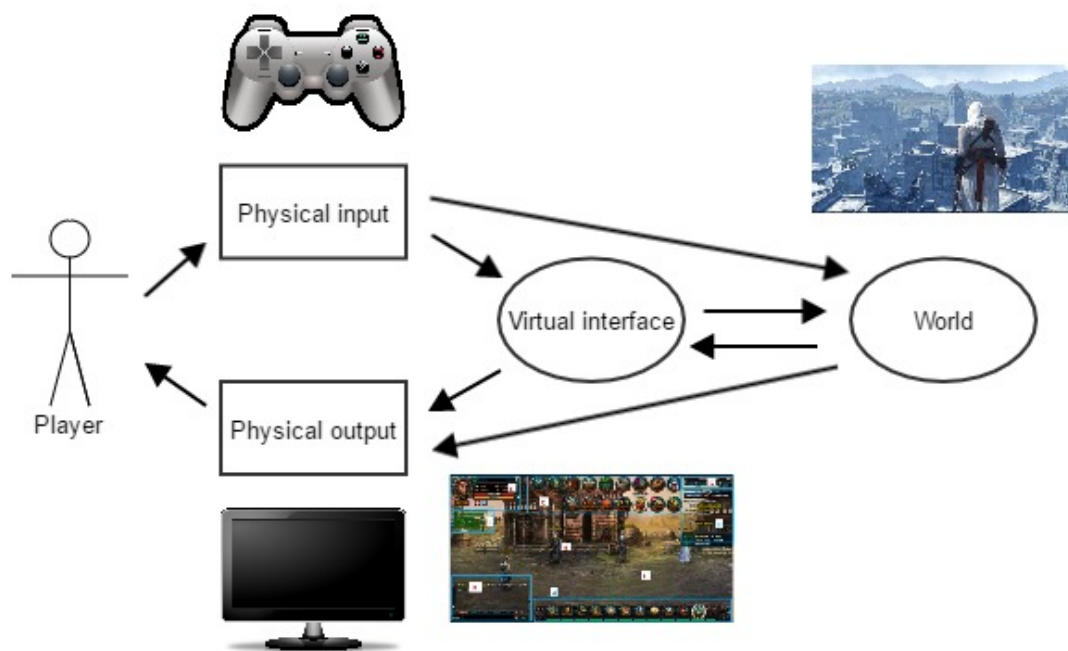


Figure 4. How the user interface work in the video game [Schell, 2014]

3.4. Game story and narrative

In the early game industry, a story forms the core of an adventure game. As the development of the game industry, elements of the story are put into other game genres, such as role-playing, action and strategy. But not all games tell stories. There were still many games succeed without the stories before, such as Tetris, Pac-man. Nowadays,

storytelling and narrative are becoming increasingly important aspects of the video games, almost all the games have stories. What benefits do the stories bring to the video games?

- The story provides a context to the video game. In addition to scores and win, the story makes the progress of the game more meaningful. As the result, the players can receive the strong emotional satisfaction during the games.
- The story also enhances the interests of the players. A good story can attract more players to play the game. A part of players plays games because of the story in the game.
- Stories improve the motivations of the players to play the games. The development of the plots can make the players ignore the repetitive and boring aspects of the video games. and keep them interested in the games. The unknown plots and endings motivate the players to keep playing.

The story in the video games are different from other medias. In books, stories are told by words; in films, the differences come from sensory experience, including visuals and audio; in games, players need to discover and experience the stories by themselves [Terence, 2013]. Interactivity is the core feature of the video games. Therefore, an interactive story is important for the video games. According to Adams [Adams,2009], an interactive story means the player feel their actions contribute to development of the plot, and it does not matter whether the direction of the plot is changed.

Narrative is a part of the video game that contribute to the storytelling. It refers to “story events that are narrated-that is, told or shown-by the game to the player [Adams, 2009]”. A few researchers believed narrative and interactivity are conflicted. Because narrative in a video game is to show the story events without the control of the player. Despite this, narrative is still an important tool for storytelling and many players enjoy the narrative moments. In video games, narrative is mainly used to depict the setting and background of the game, introduction of the game or each chapters, and the rewarding or punishment when a player tries to achieve his goal in the game. There are many forms of narrative in the video game, such as the cut-scene, scrolling text, voice-over and dialogue.

For now, more types of games integrate player experience with the story instead of only adventure games. A credible, coherent and dramatically meaningful story contributes to the playability of the video game significantly [Adams, 2009]. In order to combining story elements with the video game, creating an interactive story and balancing the gameplay and narrative events are important.

3.5. Audio-visual presentation

All audiovisual elements in the game belong to audio-visual presentation. Audio-visual presentation is about the aesthetic considerations in a game. It is an important component in the game that make the game experience more enjoyable. It determines the sense of the players during the process of playing. This Section will introduce how the audiovisual presentation contribute to playability of a game.

First, the audio-visual presentation generates the ambience of the game. It makes the game world feel solid, real and magnificent, which makes the player being involved with the game easily and deep. Second, the audio-visual presentation creates a kind of pleasure of sensation. The players will feel rewarded if the game is full of excellent artwork. It also helps the player to ignore the flaws and inconsistency of the game. Third, the audio-visual presentation supports and enhances gameplay. In Section 3.3, the interface has been introduced as an important component that support the gameplay. The form of the interface is presented through the audio and visualized presentation. In addition, visuals and audio are also important cues and indicators when the player engrosses in the gameplay. They tell the progress of the game to the player and guide them what suppose to do next. [Rollings and Morris, 2003].

In summary, five game components that affect playability are discussed in this chapter, including gameplay, game mechanics, user interface, game story and narrative, and audio-visual presentation. They are also five major components for game development or game design. Among them, game mechanics closely refers to specific rules of a game, and user interface supports the whole process of the interaction. Game rules and the interaction are both elements of gameplay. Hence, game mechanics and user interface can be considered as a part of gameplay. Game story and narrative, and audio-visual presentation mainly belong to artistic content of a video game. A part of audio-visual presentation is also affected by techniques of game development, such as graphic performance. Game story and narrative, and audio-visual presentation both contribute to the implementation of gameplay. These five game components are essential parts for game development. Through discussing the relationship between them and playability, this thesis aims to build the connection between playability and game development.

4. Enjoyment as the core player's experience in a video game

As discussed in Section 2.2, for a player, enjoyment is the main experience of playing a video game. It comes from the experience or feeling of the player in the game. Factors affect the enjoyment of a video game might contribute to playability. Accordingly, discussing the enjoyment is necessary for this study. Through literature review, two theories are found that highly contribute to the enjoyment of the video game: flow [Csikszentmihalyi, 1990] and immersion [Brown and Cairns, 2004; Ermi and Mäyrä 2005]. Through analyzing these two theories, we hope to find what characteristics of a video game affect the enjoyment.

4.1. Flow

Flow is “a state in which people are so involved in an activity that nothing else seems to matter; the experience is so enjoyable that people will continue to do it even at great cost, for the sheer sake of doing it” [Csikszentmihalyi, 1990, p4]. The activity must be voluntary, intrinsically motivating, and challenging, and it must have clear goals to be achieved. Obviously, playing the video game belongs to this kind of activity. Flow as an optimal experience is highly related to the enjoyment in the video game.

In order to achieve the flow state, a few conditions also are concluded by Csikszentmihalyi [1990] as follow:

- 1) A challenge activity that requires skills
- 2) The merging action and awareness
- 3) Clear goals and feedback
- 4) Concentration on the task at hand
- 5) The paradox of control
- 6) The loss of self-consciousness
- 7) The transformation of time

These conditions are not only set for the video game, but other activities, like work or reading. Understanding them in the term of the video game is required.

1) A challenge activity that requires skills

Optimal experiences can only occur within the process of activities that require the investment of psychic energy and certain skills [Csikszentmihalyi, 1990]. If an activity does not require skills, this activity can not be challenging. The process of overcoming challenges is stimulating and enjoyable. In the term of the video game, this condition can be understood from two aspects: the balance between difficulty and players' skill and the learnability of the video game.

Figure 5 shows the flow model that explains the relationship between the difficulty of a game and the players' skills. According to the figure, the balance between the level of challenge and skills determine the flow zone. Anxious mood is generated if the difficulty exceeds the skills of the player. On the other hand, if the challenge is too easy for the player, the player soon feels bored and loses interest. The game must provide an appropriate difficulty to the player or has mechanics of adjusting the difficulty based on

the player's skills. However, balancing the difficulty and skills is difficult for game design. Since the types of the player are various with different skills. Usually, a video game offers multiple levels of difficulty for the players, such as easy, medium and hard. the players can choose the difficulty level based on their skills. In additional, the game also increases the difficulty with the progress in the game, since players improve their skills through constant playing. Although there are a few ways to adapt the appropriate difficulty to the player, the situation of difficulty over the player skills cannot be excluded during the game. Therefore, a well-designed learning process is important for the video game.

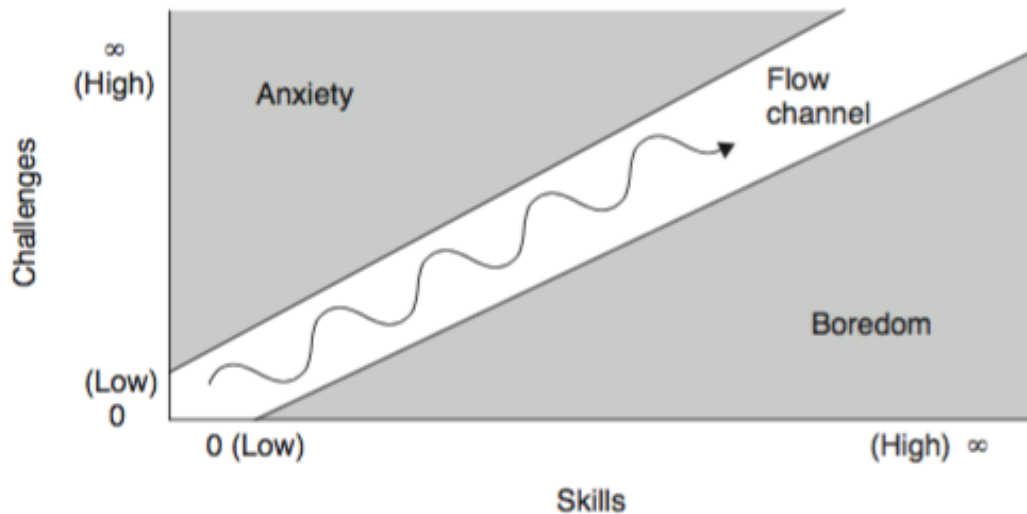


Figure 5. Flow model [Schell, 2014, p121]

Learning is a key process along the whole gaming experience. Usually, a game should be easy to learn, but be difficult to master. For the learnability of the video game, accessibility is required firstly. In another word, the first player experience is important for a game. Most games offer the tutorials for players in the beginning. The tutorial shows players the basic gameplay and background, and teach them a few required skills for the early game. “A good tutorial gives the player hands-on experience without endangering him [Bates, 2004, p.30].” In addition, the tutorial should also hook the player's attraction by combining with the game world and narrative. The tutorial of Uncharted 3 is a good example. The player starts playing the game from a dangerous and critical situation. The bleeding wounded character wakes up at a fracture train that is about to fall into the abyss. Through the progress of fleeing from the train, the player learns and practices the basic movements of the character, such as run, jump and climb. Although escaping from the train is easy to success, the urgent and tense atmosphere grabs the player's attention. As the game progresses, the players need to keep learning new skills to handle increasingly difficult levels. In this phase, the motivation of learning is required. First, curiosity from the player is needed. According to Malone [1980], providing appropriate information to make existing knowledge seem incomplete, inconsistent, or parsimonious can engage the curiosity of the player. In this situation, the player is motivated to learn new things for the purpose of supplementing his cognitive structure. Second, learning should be meaningful. In a few video games, in order to play on a high difficulty, the player has to master certain skills by drill and practice. The repetition of the practice often drives the player bored. However, if the

practice is meaningful and generates a satisfying effect, the feeling of repetition would be compensated. As Adams [2009, p.24] states:

“A game should offer useful mastery; the things that players learn should help them play the game more successfully.”

Making the play meaningful is important for the learnability in the video game.

2) The merging action and awareness

Csikszentmihalyi [1990, p53] explains the merging action and awareness as follow:

“One of the most universal and distinctive features of optimal experience is the people become so involved in what they are doing that the activity becomes spontaneous, almost automatic; they stop being aware of themselves as separate from the actions they are performing.”

The process of merging action and awareness directly relates to the interactivity of the video game. The interactivity of the video game can be seen as an interaction loop. It includes 3 phases:

1. The game presents the information to the players.
2. The players perform the actions based on the information they receive from the game.
3. The game offers the feedback information according to the players' actions.

In general, the game presents the information in the forms of the graphics, sound and text. Consequently, what and how the information is presented to the player is important in this phase, which is determined by the aesthetics, ambience and narrative in the video game. In the phase of performing the actions, the control mapping and actions are two key factors. The control mapping refers to how the player use input device (controller, keyboard or mouse) to navigate the avatar of the game. In other words, it determines which buttons the player should press to perform the expected action. Actions are what the player can perform. Actions can be considered as the verbs of the game, and the way in which the player usually thinks about his play, such as run, jump, shoot [Adams, 2009, p.276]. Various actions make the game experience fresh and rich, but might also lead to a complex control mapping. In the last phase, the game needs to give the feedback according to the actions from the player. In this context, the feedback is about the sensory information, such as the audiovisual effect of the attack action. It lets players know what they are doing and the outcomes from their actions. Accordingly, the player continues to take certain moves. Overall, these three phases constitute the interactivity of the video game. Ensuring each phase is well-designed and the communication between each phase consistency contribute to the flow experience in the video game.

3) Clear goals and feedback

As Csikszentmihalyi [1990, p55] said:

“Unless a person learns to set goals and to recognize and gauge feedback in their activities, she will not enjoy them.”

This principle is also suitable for the video game. There are many challenges and activities in a video game. The goals and the feedback drive players to accomplish them and make them enjoyable. Normally, there are more than one goal in a video game. They can be offered by the game or set by players themselves. The goals of a game need to evoke the interest of players and motivate them to play the game continuously. Consequently, how the goals are presented to the players and structured is important. Generally, the goals should be clear and compelling. The player should be easy to recognize or set the goals in the game. A well-designed game often has multi-level goals, such as long-term goals, medium-term goals and short-term goals. In this way, players can clearly identify the progress of different goals. Multi-level goals drive players to play the game with constant motivations and prevent them from getting lost in the course of playing. On the other hand, diverse types of goals are also required for a video game. For example, a shooting game usually has more than one type of goals. The major goal of a shooting game might be destroying enemies or opponents' facilities. In addition, goals related to collection or exploration also build in the game. Diverse types of goals rich the gameplay and satisfy different players' expectation.

For the feedback, there are many types of the feedback in the video game. First, each action from the player should give an immediate response from the game. These responses mostly belong to the sensory feedback. The sensory feedback has been discussed in the prior section. In addition, rewards and punishments are also a kind of feedback when a player succeeds or fails in completing a challenge or a goal. The value of the rewards need to be balanced based on the effort and risk that the player takes. The uncertainty of the rewards also strength the motivation of the player and makes the rewards more meaningful. On the other hand, punishments create endogenous value [Schell, 2014]. The value of the rewards is increased if the player might lose them. Punishments increase the risks of playing in the video game. In other word, they increase the difficulty level and raise the sense of tension. Appropriate punishments help players concentrate on the game. However, if the punishments are too heavy and frequent, the player is easy to get frustrated and feel unfair

4) The paradox of control

The paradox of control can be described as involving a sense of control [Csikszentmihalyi, 1990]. Instead of the sense of being in control, the people enjoy the sense of exercising control over the game. In the video game, the degree of the control is always limited. Making the player to have an illusion of exercising control over the game is essential. The video game offers the player a virtual world. Creating a make-believed world is key factor for the paradox of control in the video game. When a player immerses in the virtual game world, the sense of limited control is reduced. The degree of the freedom in the game is also a factor that affect the paradox of control. It depends on what players can do in the game and their influences on the game progress. In addition, the merging action and awareness can also reduce the sense of worrying about losing control during the game.

Other conditions

A few conditions are still left to be discussed, including concentration on the task at hand, the loss of self-consciousness and the transformation of time. These conditions directly link to the feeling and experience of the player. It is hard to transfer them into the game characterizes. However, all of these three conditions are related in the concept, immersion, and will be discussed in following section.

4.2. Immersion

Immersion is the sensation of being submerged in a completely other reality, losing track of the time, being highly concentrated and less aware of the surroundings and self-consciousness. The experience of immersion is derived from the enjoyment of the video game, it is a powerful experience of gaming [Brown and Cairns, 2004].

McMahan [2003, p68] believes “immersion means the player is caught up in the world of the game's story (the diegetic level), but it also refers to the player's love of the game and the strategy that goes into it (the nondiegetic level)”. From the perspective of the nondiegetic level, immersion can be specified with the term engagement. For a few players, getting the highest points, challenging the most difficult level, completing all achievements and showing off their skills make them engage with a game. From this point of view, narrative of a video game is not important for them. The player mainly concerns about the value of strategies or skills. From the perspective of the diegetic level, the concept of “presence” is used to specify the term immersion for 3D video games. McMahan [2003, p72] sums up and analyzes 6 elements of presence, including quality of social interaction, realism, telepresence, perceptual and psychological immersion, the use of social actor in the medium and intelligent environment.

Quality of social interaction means the ability for all the players interact with the virtual game world and with each other. It creates a sense of togetherness. For a multiplayer environment, collaborative work by the players and feedback from the game world and other players are the key of social interaction. For a single player environment, social interaction mainly depends on the shape of the avatar. The game should carry the player along with the avatar. Realism means that the player believes in all the components of the virtual game world, such as objects, characters and stories. Telepresence is to place the player at a remote or accessible location by using videos and graphics [McMahan, 2003, p77]. In the virtual location, the player feels the same sense of controlling as the real world. Perceptual and psychological immersion means reducing the interference from the real world and making the player perceive only the virtual game world. The use of social actor represents how the player interact with other virtual characters in the game world and relationships between them. Intelligent environment represents the game system respond to the player like an intelligent and social agent. All the elements contribute to a high sense of presence.

Brown and Cairn [2004] believe that players need to invest enough time, effort and attention in order to immerse into the game. The level of the investment determines the degree of the immersion experience. As a result, they divide immersion into three levels: engagement, engrossment and total immersion. Engagement is the first level of immersion. In this level, the game needs to grab players' attention and to motivate them to invest efforts on the game. The first look and feel about the game is important in this stage. The quality of audiovisuals, background story and accessibility of the game

contribute to the player's engagement. The accessibility depends on the game control and learning process of the game. As players invest more and more efforts, the game builds the connection with players' emotion. Then, players reach the second degree, i.e. engrossment. Players feel a make-believe virtual world and suspend their disbelief of the game world. In this phase, the construction of the game is essential. It relates to the structure of the goals and plot in the game, and the harmony of the gameplay, audiovisuals and plot. In the degree of total immersion, players generate the feeling of being in the other reality. The atmosphere in the game and the empathy from players are important in this phase. They highly depend on the combination of graphics, sounds, plots and gameplay of the game.

In addition, Ermi and Mäyrä [2005] classify the immersion of the video game into three dimensions: sensory immersion, challenge-based immersion and imaginative immersion. Sensory immersion relates to the audiovisual elements of the game. Powerful sensory stimulus can let players get rid of the interference from the real world and fully concentrate on the game world. Challenge-based immersion is the core of the game based on the interaction. It highly refers to the feeling of achieving a satisfied challenge with balanced difficulty by suitable skills. Imaginative immersion depends on the story and game world. Through showing the game world and the story to players, the game let players generate empathy with the game and engage in the virtual reality. These three dimensions of immersion intertwine with each other and contribute to the overall immersion.

Mekler et al. [2014, p57] develops the PX framework that clarifies the relationship between enjoyment, flow and immersion (see Figure 6). Mekler et al. [2014, p56] believes the experience of enjoyment and immersion are the main prerequisites of flow, but players can also experience enjoyment without reaching flow state. As the Figure 6 shows, enjoyment represents the valence of the player experience, and immersion represents the intensity of the player experience. The high degree of immersion and enjoyment can be understood as flow.

Although there are different understandings about the concept of flow, immersion and enjoyment, they are all helpful to explain or define an expected state or experience of the player when they play a game. Playability as a kind of specific quality requirement, it should transform players' expectations into contributions for game development. Through the literature review, this thesis analyzes a few factors that affect enjoyment of the video game. Some of them can correspond to relevant game components and become attributes that affect their quality. For example, a challenge activity that requires skills is a condition of the flow experience, and it defines what is an enjoyable challenge activity. This condition corresponds to gameplay, since a challenge activity is the basic element of gameplay. Through analyzing the condition, difficulty and learnability can be considered as two attributes that affect gameplay. Appropriate difficulty and well learnability improve the quality of gameplay, thereby enhancing playability. Accordingly, the study supposes game components with attributes can be transformed into playability requirements, thereby contributing to game development. Based on the literature review, this thesis hopes to develop the theory of playability requirements by analyzing game reviews on the web.

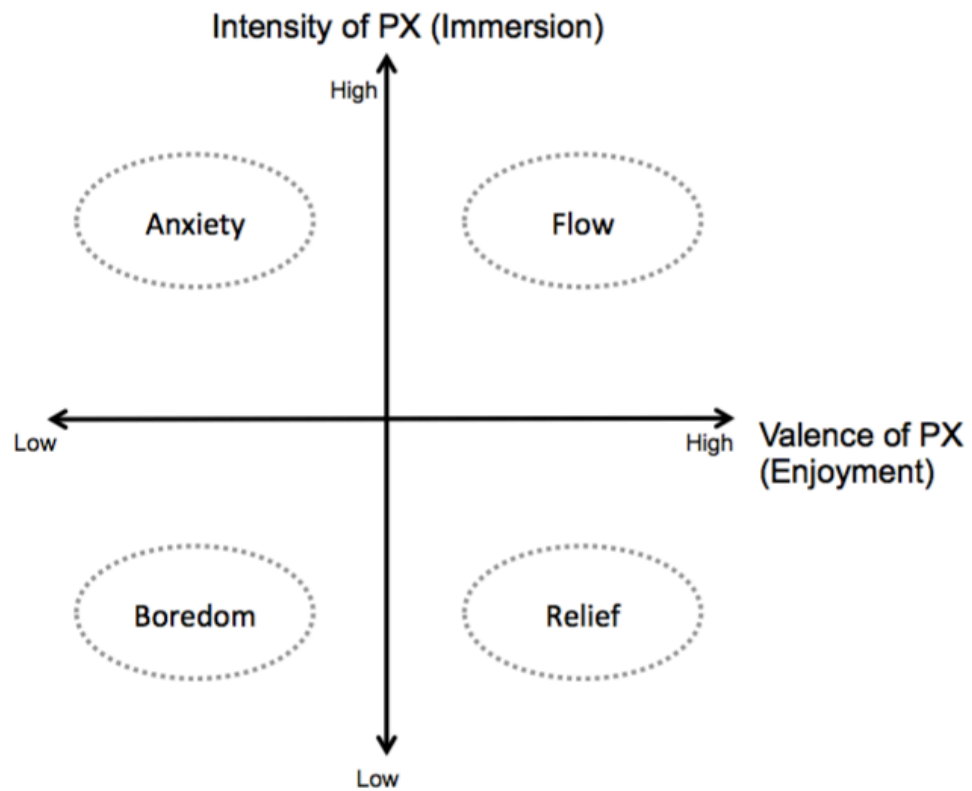


Figure 6. Valence and intensity of PX framework. Enjoyment describes the valence of the player experience, whereas immersion may denote its intensity. [Mekler et al., 2014, p57]

5. Game reviews

Game reviews form a collection of opinions or thoughts of a game expressed by players. They contain a lot of information about the quality of a game. In general, game reviews could be divided into two types based on the type of reviewers: commercial game reviews and user reviews.

Commercial game reviews provide authoritative and independent game reviews on game or entertainment based websites, such as GameSpot [GameSpot, 2016] and IGN [IGN, 2016]. The aim of commercial game reviews is to introduce different games to players and guide them to choose needed games. In general, reviewers of commercial game reviews should be professional journalists with extensive knowledge and experience in game industry. They are required to have a depth experience of a game before writing a game review. For example, the reviewer of Final Fantasy XV review in Gamespot [Brown, 2016] has over 60 hours game time of Final Fantasy XV (see Figure 7). On the other hand, reviewers need to offer a critical evaluation on the target game objectively. The content of a commercial game review should contain as much information as possible about what a game is trying to do and how the game succeeds or fails. Accordingly, the commercial game review can be considered as a comprehensive evaluation for a game. It is analytical and critical.

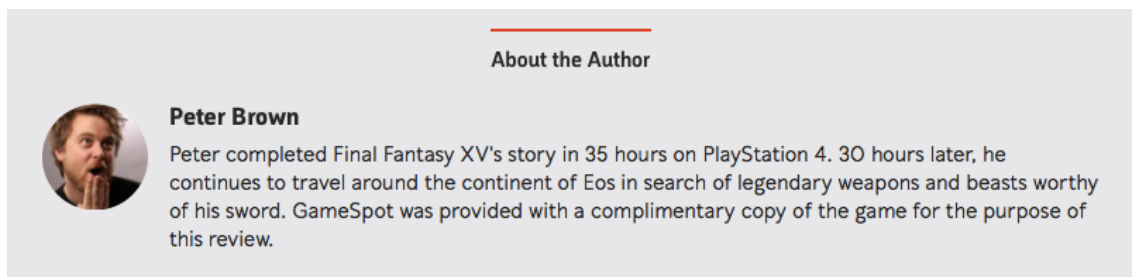


Figure 7. The reviewer of Final Fantasy XV review in Gamespot.

In general, the commercial game review comprises of two components: the full written review and the verdict. Figure 8 and Figure 9 show a few examples of the full written and the verdict of different websites [IGN, 2016; GameSpot, 2016; PC Gamer; 2016]. According to Figure 8, the full written review is usually an article that contains the description, the analysis and the comment for different components of a game. It is detailed and well-structured. In addition, commercial game reviews always contain the verdict after the full written review. According to Figure 9, the verdict is usually a brief conclusion or summary for the quality of a game. In the verdict, the major praise and criticisms are summarized into a short paragraph, together with an overall score of the game. The verdict is prepared for the readers who do not want to read an entire article. It helps them understand a game quickly.

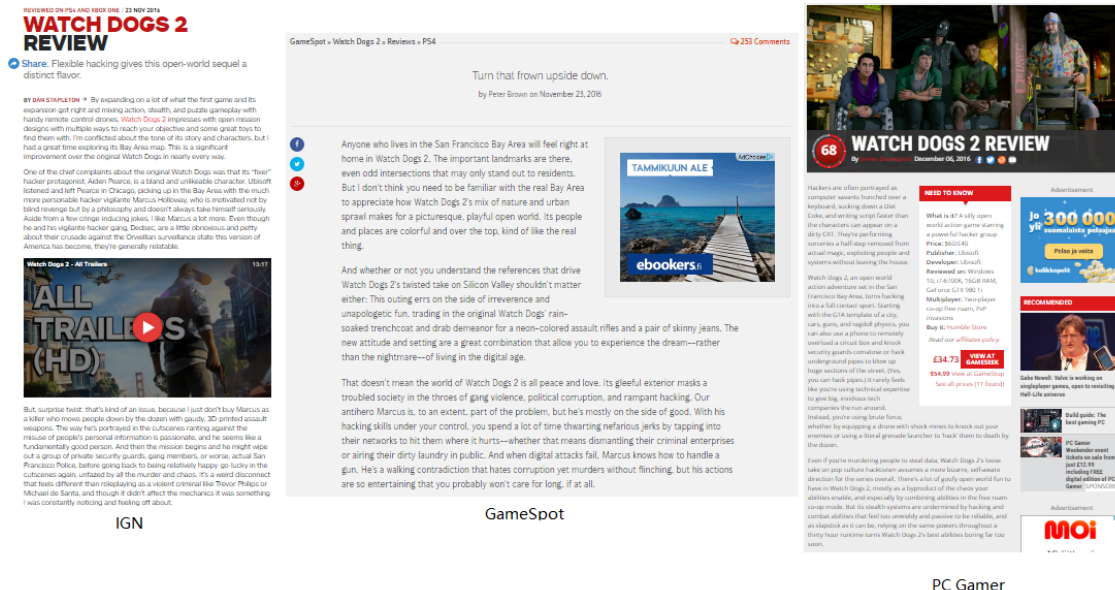


Figure 8. Examples of the full written review

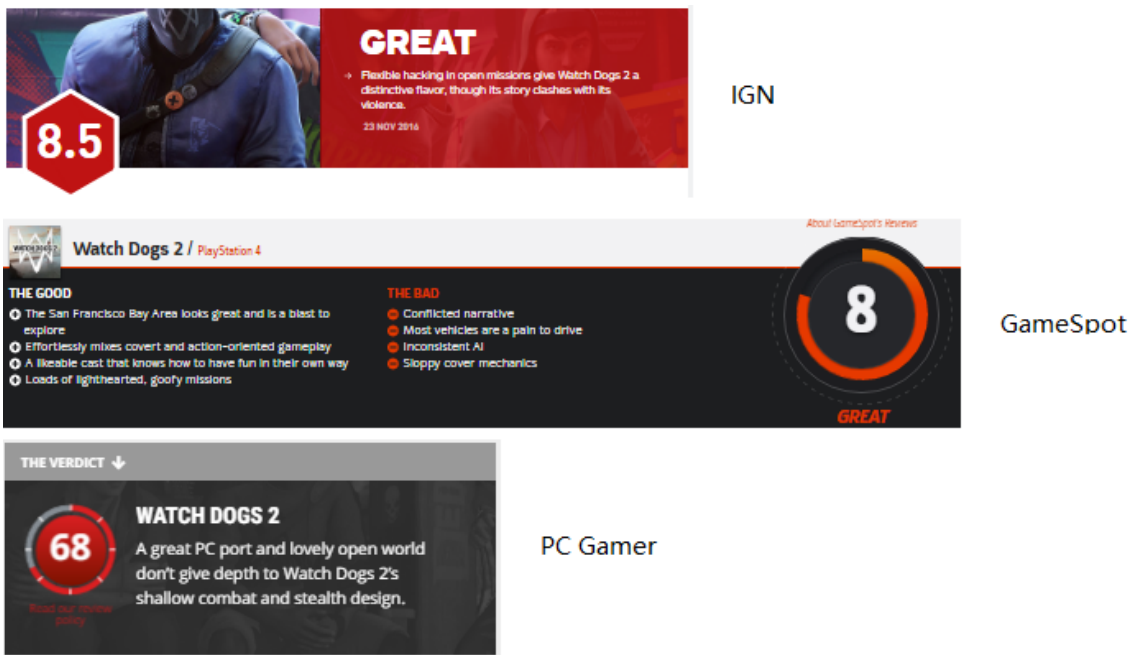


Figure 9. Examples of the verdict

User reviews are general player comments on the game, as shown in Figure 10. There are no requirements and limitations for the reviewer. Although a few user reviews are similar to commercial game reviews that are written by professional players, most of them are short, partial and descriptive. In general, user reviews are similar to the verdict section of commercial game reviews. They contain an overall rating for a game, but lack specific analysis and explanations. In addition, the authenticity of user reviews is hard to verify. A few comments might not be written by the real players. However, compared to commercial game reviews, the amount of user reviews is enormous, and sources of user reviews are rich and varied.

7 KayVen17 Jan 11, 2017

Deutsche Review - Kritik

Der folgende Test ist in 5 Kategorien zusammengefasst. Diese 5 Kartegorien ergeben die Gesamtpunktzahl von 0 - 100 Punkten. Um einen passenden Userscore zu geben wird auf oder abgerundet. Bei 84 Punkten ergibt das einen User Score von 8. Bei 86 einen von Userscore von 9. Falls eine 85 kommt entscheide ich ob ich es eher positiv oder negativ nehme. Regeln verstanden?
Dann sind hier meine Punkte.

Mein persönlicher Score = 74/100
Mein User Score = 7/10 [Collapse ▲](#)

0 of 1 users found this helpful All this user's reviews

8 WagyuMeatloaf Jan 10, 2017

I skipped WD1 but I really enjoyed every moment of this one. The story and characters are about what I expected. Pros and cons below.

- + The main and side missions were longer than I expected and there's online stuff that I haven't gotten around to yet.
- + Graphics, sound, and environment are excellent. Exactly what you would expect from a AAA console title.
- + I generally dislike games with puzzles but these were well-done. They didn't feel like a chore at all.
- + Different play styles are viable. I had a blast hacking my way through everything but shooting and stealth are definitely doable too.

- Money doesn't do anything except buy weapons and cosmetics but the weapons you pick up off dead enemies are generally good enough.
- Hacking and tech makes it too easy but then again you don't have to play that way [Collapse ▲](#)

1 of 1 users found this helpful All this user's reviews

9 Chris-Krollz Jan 10, 2017

I really liked playing Watch dogs 2 in San Francisco, away from the grim and gray Watch Dogs 1!

WD2 is fresh, super funny, the characters are really fun to around with and you soon get sucked into that little gang of vigilante. The story line and events happening in the game are interesting and some take their roots in real life so it adds to the fun :)

Gameplay wise you have the option of playing stealth or full brutal (playing stealth and hacking things is the most fun ^^)
Driving was ok but it's still not the strongest point of the series. It does the job though nothing more. [Collapse ▲](#)

1 of 1 users found this helpful All this user's reviews

Figure 10. Examples of user reviews from Metacritic [Metacritic, 2017]

6. Grounded theory

Based on the understanding about playability and non-functional requirements, this thesis aims to construct a playability framework that can be used to analyze and manage the player feedback on playability in the form of non-functional requirements. In order to conduct this research, appropriate empirical data are required. There are a number of methods of collecting research data, such as questionnaires, surveys, interviews or user testing. Most of these methods require a certain number of participants. This study focuses on playability of the video game, using the above mentioned methods, the author shall collect data from a large number of participants in order to obtain comprehensive and unbiased results, which seems a big effort in a short time frame. Instead, game reviews discussed in Chapter 5 could be used. They are numerous and easy to collect. Moreover, game reviews contain rich information related to playability.

In order to analyze game reviews, this thesis selects grounded theory as the research method. There are a few reasons for choosing grounded theory as the research method. First, game reviews contain a lot of text information about the personal experience and the thought. According to Simth et al. [1995, p.29], grounded theory methods are suitable for researching “typical social psychological topics such as motivation, personal experience, emotions, attraction, etc.” The second, analyzing game reviews is a qualitative and empirical research. This study aims to develop a new and undefined framework instead of verifying an existed framework. The grounded theory is a general methodology that provide a way of developing theory from the empirical research [Glaser, 1967]. It offers a series of logically consistent procedures for checking, refining and developing theory, from data collection to data analysis [Smith et al., 1995]. As a result, grounded theory is a suitable method for this study. For the grounded theory, data are collected and analyzed simultaneously. “The early analytic work leads the researcher subsequently to collect more data around emerging themes and questions [Smith et al., 1995, p31]”. The more the data is collected, the deeper the analysis is conducted. Generally, the analytic procedure of the grounded theory includes three steps: coding, memo-writing and theory sampling.

The first step of the analysis is coding the data. “Theories can’t be build with actual incidents or activities as observed or reported; that is, from “raw data” [Corbin and Strauss, 1990, p420]”. Coding aims to conceptualize and categorize the data. In this phase, data are labeled with different concepts, and similar concepts are grouped together. In a word, “coding is the process of defining what the data are all about [Smith et al., 1995, p37]”.

Memo-writing begins with a few important concepts and categories emerged from the coding. It aims to “spurs you to start digging into implicit, unstated and condensed meaning [Smith et al., 1995, p43]”. Memo-writing helps researchers to specify and define the categories and their properties or characteristics, and elaborate the process of changing and developing a category.

As a few ideas about the categories are developed, theoretical sampling begins. Theoretical sampling is the process of “collecting more data to clarify your ideas and to plan how to fit them together [Smith et al., 1995, p45]”. Based on comparative methods, theoretical sampling helps researchers to fills out the categories and find the

relationship between them. Based on these three steps, the final result is refined and generated.

6.1. Game reviews for this research

Game reviews on web are various, choosing appropriate game reviews for this research is important. There are two aspects that need to be considered: which types of game reviews do we collect and what kind of video games do we focus on. As discussed in Chapter 5, there are two types of game reviews, including commercial game reviews and user reviews. Commercial game reviews are detailed, analytical and critical that are written by professional game journalists. User reviews are written by players. Their numbers far exceed the number of commercial game reviews, and their sources are extensive. But user reviews are always short, partial and lack of specific analysis and explanations. Some of user reviews even are not written by the real players. Choosing user reviews as research data takes much more effort on the stage of data collection and data pre-processing. Accordingly, commercial game reviews are more suitable for this research.

In this research, game reviews from GameSpot [GameSpot, 2016] are collected as the research data. GameSpot is one of the most popular video gaming website that offers a large number of game reviews. Those game reviews are written by reviewers who have extensive experience with the series or genre in question. Game reviews on GameSpot are also consisted of two parts: the full written review and the verdict. The full written review is an article that contains the description, the analysis and the judgment for different components of a game. It contains detailed information about a game. For example:

“I kicked people through skylights, blasted them off seaside cliffs, lured them into bottlenecks and watched as my carefully placed shrapnel mine shredded them. At one point, I got murdered badly, so I reloaded a recent quicksave, shot a guard with incendiary bolt, and blew up another four with one grenade when they ran to help. Sadistic? Yes. But also incredibly satisfying from a gameplay standpoint. Moments like that happen frequently in Dishonored 2 because it's as much a toy box as it is a game. It's meant to be experimented with. It rewards and even demands creativity.” [Butterworth, 2016]

This paragraph is a part of the review of the game Dishonored 2 [Butterworth, 2016]. The reviewer describes the process of the combat and gives a short comment with specific explanations. The verdict of game reviews on GameSpot is a little different than others. It is not just a brief conclusion and a score. Figure 11 shows an example of the verdict section of a game review on GameSpot. The verdict section consists of the good, the bad and an overall score. The good is a brief list contains all the major praise of a game, and the bad is a list contains all the major criticisms of a game. And the reviewer also gives an overall score of the game based on the comprehensive evaluation of the game. Moreover, detailed descriptions and analysis for both good points and bad points can be found from the full written review. The verdict of game reviews on GameSpot contain more information than others, which benefit to data analysis.



Figure 11. The verdict section of the game review on GameSpot

In addition, the choice of the type of video games is also important. In this study, a total of 41 game reviews for 41 video games are collected, as shown in Table 2. The type of video games is various, analyzing game reviews related to all types of the video games is too ambitious. In this case, video games that are scored more than 8 by Gamespot are within selection. Game reviews with the high score often contain more content, including the more verdicts and the longer article. They can offer more information for data analysis. Low score games often have a few problems related to the development, such as the undeveloped content and bugs. These problems are not in the scope of the study. In addition, these games are well received by the public. Personal preferences and prejudices from reviewers can be reduced. Analyzing game reviews with the high score is effective and efficient for this study. As a result, video games released in the last three years and scored more than 8 by Gamespot are selected. As can be seen from the Table 2, most of the selected games belong to the action game. The action game is a super-genre that covers features of other game genres, such as RPG and strategy games [Adams, 2009]. Analyzing reviews of the action game can lead to a concrete result. In addition, all the selected games are the single-player game. Issues relate to social interaction and multiplayer gaming are not considered in this study.

Game name	Type	Year	Publisher
The Witcher 3: Wild Hunt	Role-playing	2015	CD Projekt
Dark Souls 2	Action role-playing	2014	Bandai Namco Games
Hotline Miami 2: Wrong Number	Top-down shooter	2015	Devolver Digital
SOMA	Science fiction survival horror	2015	Frictional Games
The Walking Dead: Season Two - A Telltale Games Series	Adventure	2013	Telltale Games
Grand Theft Auto V	Action-adventure	2013	Rockstar Games
Metal Gear Rising: Revengeance	Action	2013	Konami Digital Entertainment
BioShock Infinite	First-person shooter	2013	2K Games
Rise of the Tomb Raider	Action-adventure	2015	Square Enix
Hyper Light Drifter	Action role-playing	2016	Heart Machine
Apotheon	Action role-playing	2015	
The Binding of Isaac: Rebirth	Independent roguelike	2014	Nicalis
A Bird Story	Adventure role-playing	2014	Freebird Games
Transistor	Science fiction action role-playing	2014	Supergiant Games
Wolfenstein: The New Order	Action-adventure first-person shooter	2014	Bethesda Softworks
Life Goes On	Comically-morbid platform	2014	Infinite Monkeys
Valiant Hearts: The Great War	Puzzle adventure	2014	Ubisoft
The Walking Dead: Season Two - A Telltale Games Series	Adventure	2013	Telltale Games
The Flame in the Flood	Survival adventure	2016	The Molasses Flood
Volume	Indie stealth-based	2015	Mike Bithell Games
The Aquatic Adventure of the Last Human	Action-adventure	2016	YCJY
Grim Dawn	Role-playing		Crate Entertainment
The Incredible Adventures of Van Helsing II	Action role-playing	2014	NeocoreGames
Resident Evil 4 HD Edition	Survival Horror	2014	Capcom
Tower of Guns	Roguelike	2014	Terrible Posture Games
Oxenfree	Adventure	2016	Night School Studio

Half Minute Hero: The Second Coming	Action role-playing	2014	Marvelous
Fenix Rage	Platform	2014	Reverb Triple XP
The Escapists	Strategy	2015	Team17
Crypt of the NecroDancer	Independent roguelike rhythm	2015	Brace Yourself Games
Five Nights at Freddy's	Adventure survival horror	2014	Scott Cawthon
Gravity Ghost	Puzzle	2015	Ivy Games
Just Cause 3	Action-adventure	2015	Square Enix
Lost Constellation	Adventure	2015	Finji
Grow Home	Adventure platform	2015	Ubisoft
Oblitus	Roguelike	2015	Adult Swim
Republique	Adventure stealth	2013	GungHo Online Entertainment
Jotun	Action	2015	Thunder Lotus Games
Downwell	Roguelike platform	2015	Devolver Digital
Far Cry Primal	Action-adventure	2016	Ubisoft
SUPERHOT	Independent first-person shooter	2016	Superhot Team

Table 2. A list of 41 video games

6.2. Coding and memo-writing

In the early phase of the research, we only collect the verdict of the game review, since it is concise and easy to collect. The verdict contains the good and the bad of a game. They are concluded as a series of phrases by reviewers. Line by line coding is used, it is a kind of coding method about naming each line of data. Through coding the good and the bad of a game, the author aims to determine the research direction and the type of data need to be collected further. The line by line coding is conducted based on one question: what are game components related to the data?

According to the discussion of game components in Chapter 3, the collected data is associated with one or more game components. For example, Table 3 shows a part of data that is coded as gameplay. Gameplay is about challenges, goals and the interaction between the player and the game. In Table 3, all the data is related to the combat process of the game. The combat is a kind of way to complete a challenge or a goal in the video game. It requires players to interact with the virtual game world. Accordingly, the data is coded as gameplay. Chapter 3 concluded five game components related to playability. Among them, gameplay, game mechanics and user interface are connected closely with each other. Game mechanics can be considered as the tools that support gameplay. User interface can be seen as the interface of gameplay. It displays gameplay to the player and receives data to gameplay from the player. During the process of line by line coding, we find that the concepts of gameplay, game mechanics and user

interface are inseparable. For example, data related to the combat belong to gameplay, but the combat system of a game also contains combat mechanics and combat user interface. Hence, data related to game mechanics and user interface are also coded as gameplay.

GameNum	Initial data	Categories
N11	Limited combat options leads to monotony towards the end	Gameplay
N14	Empowering combat system that fuses real-time and turn-based action	Gameplay
N15	Old-school combat mechanics are a refreshing change of pace	Gameplay
N2	Lots of tweaks to the Dark Souls formula that make exploration and combat consistently rewarding	Gameplay
N23	Quick, rewarding combat	Gameplay

Table 3. A part of data that is coded as gameplay

After the line by line coding, a total 216 verdicts were collected and analyzed. Data is classified into three categories: gameplay, game story and audiovisual elements, shown in Appendixes 2. Among them, 123 verdicts belong to gameplay, accounting for 57% of the total. Data belong to game story and audiovisual elements is mainly related to the aspects of literature and art, which is beyond the scope of this study. As a result, the later analysis would focus on gameplay.

GameNum	Initial data	Attributes
N22	Impressive range of character classes and skill development	Variety
N2	Tons of cool creepy, challenging bosses	Variety
N23	Dense environments that give you plenty to do	Variety
N33	Numerous options for destructive experimentation	Variety
N40	Limited weapon set	Variety

Table 4. A part of data contains the concept of variety

In addition, some of data reflect the similar attribute that affect the enjoyment of playing. Hence, data with the similar attribute is also collected together during the line by line coding. For example, Table 4 shows a part of data contains the similar attribute, the study concluded it as variety. A few keywords are bolded in the table, including impressive range of, tons of, dense environments, numerous options and limited. As the data shows, different kinds of character classes, skills, enemies, environments and ways of destructions are considered as the fun of a game. And a limited number of weapons disappointed the reviewer. The data all shows the concept of being different and diverse. Therefore, the study labeled the data in Table 4 with variety. As these similar attributes are discovered and concluded, memo-writing begins. Also taking variety as an example, through further analyzing the data labeled with variety, variety is understood as various ways for players to interact with environmental objects or encounters in the virtual game world. It might be affected by many factors, such as tools that can be used by players or types of enemies. As a result, we memo-write variety as follow (see Appendixes 3):

“Variety is about various ways for players to interact with environmental objects or encounters in the virtual game world. It creates multiple options for playing styles. Variety might be affected by tools, levels, and goals of the game.”

Based on the coding and memo-writing, five frequently occurring attributes are concluded, as shown in Table 5. However, there is a lack of concrete details and explanations about the data from the verdict.

Attributes	Memo-writings	Example
Variety	Variety is about various ways for players to interact with environmental objects or encounters in the virtual game world.	“Numerous options for destructive experimentation.”[Mahardy, 2015]
Meaningfulness	Each action from the player, completing a stage or a goal should be meaningful for the player. From the micro-terms, meaningfulness is reflected in the feedback of each action from the avatar.	“Lots of tweaks to the Dark Souls formula that make exploration and combat consistently rewarding.” [Vanord, 2014]
Fairness	It represents reasonable difficulty and risk-return in achieving a goal.	“Gives you minimal guidance and trusts you to triumph on your own terms.” [Vanord, 2014]
Pace	Pace is about the speed and the time of performing a series actions or achieving goals in the game. It depends on the frequency of players’ manipulations, effort of completing goals and the distribution of different goals.	“Fast-paced action keeps you coming back despite failure.” [Tran, 2015]
Intuitiveness	Intuitiveness allow players control avatars to perform actions smoothly and without conscious reasoning.	“Catchy beats are a joy to move with”[Bates,2014]

Table 5. The result of the coding and memo-writing

6.3. Theoretical sampling

In order to further analyze gameplay category and its attributes, the rich and detailed data related to gameplay need to be further collected. Accordingly, the full written reviews correspond to the verdict (123) were collected, and Table 6 shows a part of data that further collected. Through analyzing the data from the full written reviews, the data were classified into four categories, including Avatar, Game World, Goal, and Control, as shown in Table 7.

The process of the classification was similar as coding. The study found similar concepts from the full written reviews and categorized them. Avatar (37%) contains data related to entities that can be controlled by players directly. In general, the entity is the major character of the game. The character usually can perform certain actions and skills, and can use a few tools or weapons. As the example of Avatar in Table 7, a few words were bolded that characterized the category of Avatar. They were grenades, remote mines, vehicles, and the tether, which can be used and belong to the character.

In this way, other three categories were also developed. Game world (20%) contains the data related to other entities of the game, such as enemies, obstacles, environments. Goal (54%) includes the data related to the process of achieving a goal. Players usually need to overcome a few challenges or learning a few new skills during the process. Control (7%) contains the data related to control mechanics of a game. Control mechanics represent the way of a player control the avatars in a game. The interaction between the player and the hardware (controller, mouse or keyboard) and the feeling about the control all belong to Control.

Data from the verdict	Data from the full written reviews
“Numerous options for destructive experimentation.” [Mahardy, 2015]	“What follows is a collision of spectacle and scale. Helicopters dot the sky. Explosions chain across the screen. Combining a parachute and grenade launcher transforms Rodriguez into a floating artillery battery from above. In a world teetering toward total destruction, Just Cause 3 grants you the tools to push it over the edge. The traditional grenades, remote mines, and numerous land, air, and sea vehicles are all on call in the rebel arsenal. Then there's the tether: this grappling hook modification attaches two separate objects, and flings them toward each other, often with hilarious results. Rodriguez can reel enemies toward explosive barrels, collapse watchtowers, and pull attack helicopters into a fiery end. It's a testament to this game's creativity that guns were my last resort.” [Mahardy, 2015]
“Lots of tweaks to the Dark Souls formula that make exploration and combat consistently rewarding.” [Vanord, 2014]	“These changes might not have worked had Dark Souls II not made discovery such a thrill, but with each new area comes a new wondrous vista and a new challenge to overcome. The early forests and ruins are very Dark Souls, but the intricate architecture and carefully planned enemy locations make even familiar-looking environments fresh and unique. The more progress you make, however, the more unusual the settings become, and the more you need to consider new methods of approach. Suddenly, undead freaks are flinging themselves to the ground and exploding, and so you must hasten your rhythm. You walk through an archway and into the thickest fog imaginable, where you cannot lock on to the ghostly shimmers that attack you. Poison rains from the sky, bedeviled urns curse you when you linger near, and anthropomorphic tortoises stop, drop, and roll all over your puny body. Dark Souls II wants to kill you, but the cycle of death and rebirth is worth it if it means finding the royal ring that lets you open that giant door and discover what new and wonderful lands lie beyond it.” [Vanord, 2014]
“Fast-paced action keeps you coming back despite failure.” [Tran, 2015]	“But once you start to become familiar with the game’s array of obstacles and learn how to better react to situations, playing Downwell at a quicker pace becomes incredibly enjoyable. Keeping up with your character's fast falling speed and making snap decisions on how to deal with enemies while speeding past platforms can occasionally lead to disaster. But managing to hurtle through a large stretch of a level while dealing with everything that comes your way without even touching the ground is a joyous feeling, when you pull it off.” [Tran, 2015]

Table 6. A part of data from the full written review

Categories	Example	Total
Avatar	“In a world teetering toward total destruction, Just Cause 3 grants you the tools to push it over the edge. The traditional grenades, remote mines, and numerous land, air, and sea vehicles are all on call in the rebel arsenal. Then there's the tether: this grappling hook modification attaches two separate objects, and flings them toward each other, often with hilarious results. Rodriguez can reel enemies toward explosive barrels, collapse watchtowers, and pull attack helicopters into a fiery end. It's a testament to this game's creativity that guns were my last resort.” [Mahardy, 2015]	46
Game world	“The variety of options available in any given firefight is staggering. In fact, these encounters often feel more like puzzles. At one point, Rise of the Tomb Raider stages a battle on a frozen pond. Eight guards with heavy armor present a serious challenge, but by using the water, several holes in the ice, and the weapons at my disposal, I could even the odds. It was such an engaging encounter, I reloaded my checkpoint just to play it again. This game is filled with chances to experiment.” [Mahardy, 2016]	25
Goal	“That's a lot of abuse to hurl at players, particularly when it also means that some playthroughs will inevitably be easier than others. However, Oblitus keeps it manageable with zones that feel just large enough to deliver a satisfying sense of exploration while remaining compact enough to keep replays worthwhile. (There's even an achievement for beating the game within 25 minutes.)” [Johnson, 2015]	67
Control	“When you get a monster's movement down and can maneuver around it in time with the song, combat can start to feel like a dance. "Forward, forward, back, forward, slash, dodge, slash..." It takes the concept of tapping your fingers to a beat to a whole new level, especially combined with a fantastic soundtrack featuring music you naturally want to tap along to.” [Peele, 2015]	9

Table 7. Categories of gameplay

Through previous analysis, each verdict has a corresponding detailed explanation from the full written review. Moreover, each verdict has two types of labels, attributes and categories of gameplay. Based on them, concepts of categories and attributes were further developed, and different attributes are corresponded to different categories.

For example, one of the good in the review of the game Rise of the Tomb Raider is “Engaging combat scenario”. Specific argument for this comment is collected from the full written review, as follow:

“And when it comes to combat, Rise of the The Tomb Raider is superb. The variety of options available in any given firefight is staggering. In fact, these encounters often feel more like puzzles. At one point, Rise of the Tomb Raider stages a battle on a frozen pond. Eight guards with heavy armor present a serious challenge, but by using the water, several holes in the ice, and the weapons at my disposal, I could even the odds. It was such an engaging encounter, I reloaded my checkpoint just to play it again. This game is filled with chances to experiment” [Mahardy, 2016 b]

This argument is related to variety of gameplay, as the reviewer writes: “the variety of options available in any given firefight is staggering”. Analyzing the argument shows the variety of options comes from the game world and the avatar. For the game world, complex environments contribute to the variety, the player can use the environments to destroy powerful enemies, such as the water and holes in the ice. For the avatar, the use of different weapons contributes to variety. Through the cooperation between complex environments and the use of weapons, the game offers diverse options for a combat. In addition, the argument also shows the relationship between the avatar and the game world. The water, holes in the ice and eight guards belongs to the game world. The character that is controlled by player belongs to the avatar. The character can dive into the water, crawls out of the holes and use weapons to destroy the guards. Accordingly, the relationship between them can be considered as the interaction.

In the course of theoretical sampling, the data is classified into four categories, including Avatar, Game World, Goal and Control (see Appendixes 4). These four categories can be considered as four elements of gameplay. Attributes of gameplay are further defined based on the four elements. In addition, the relationships between the four elements are also identified during the process of theoretical sampling. According to attributes of gameplay, the four elements and their relationships, the playability framework is developed.

7. Playability Framework

Through analyzing game reviews using the grounded theory method, playability framework (see Figure 12) is developed. This framework divides playability requirements into three categories: Gameplay, Audiovisuals and Story. This study focuses on the gameplay. Consequently, common attributes of gameplay that affect playability are also concluded.

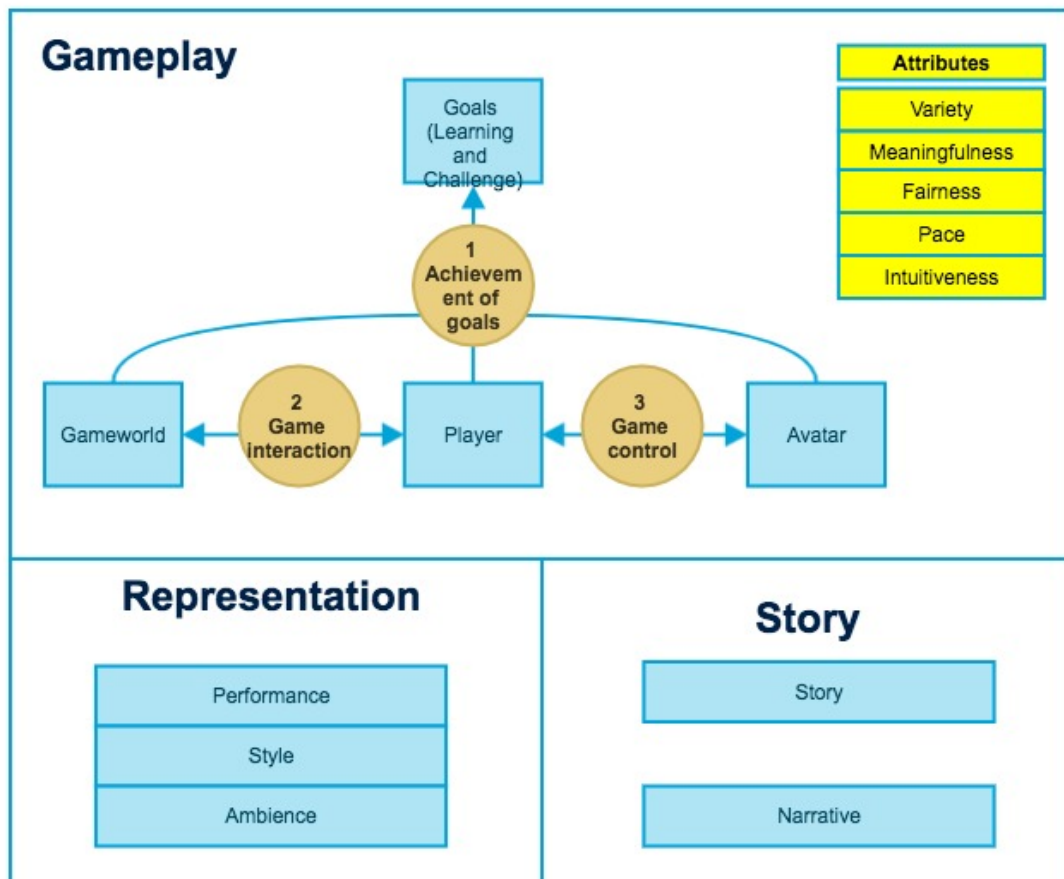


Figure 12. Playability framework

7.1. Categories of playability

7.1.1. Gameplay

Gameplay is the major category that influence playability of the game. In this study, most collected data refer to gameplay. In Figure 12, the category of gameplay consists of four elements: player, avatar, game world and goals. A player represents the person who is playing the game. An avatar represents an entity that the player can control directly in the game, such as a character, a facility or a vehicle. The game world can be considered as the space available to the player. All entities except for avatars in this space belong to the game world, such as encounters, pickups, or environments. Goals represent objectives that a player expects to achieve in the game. They could be given by the game or generated by players themselves. The bases of a goal are the challenge

and the learning, since players usually achieve a goal in the game by overcoming a series challenges or learning a few new skills.

Based on the relationships between the four elements, gameplay is classified into three categories that are marked with numbers in Figure 12, including Game control, Game interaction and Achievement of goals. Game control (marked with number 3) represents the process by which a player makes his avatar behave in the way that he wants in the game. The player can control his avatar by certain input hardware, such as a controller, a mouse or a keyboard. Game interaction (marked with number 2) represents the interaction between an avatar and the game world. In the game, a player can control his avatar to interact with entities of the game world. The avatar can perform certain actions. Based on these actions, the game world offers the feedback to the avatar and vice versa. Achievement of goals (Number 1) is about goals of a game and the process of achieving those goals. Through controlling the avatar to interact with the game world, the player aims to achieve his expected goals.

7.1.2. Representation and Story

Representation is about the display of a video game. The game content is displayed to players in the form of texts, images and sounds, all about audiovisual elements of a game belong to representation. Turing the phase of line by line coding, 36 comments are coded as representation. This thesis finds three factors that affect representation of a game from them, including performance, style, and ambience. The performance of representation means the graphics and sound quality of the game. It mainly depends on techniques and the game engine that are used in game development. The style of representation determines the aesthetic type of the game, including the art style and the type of the soundtrack. For the game, there is not a specific aesthetic type that players always appreciate. Combing the theme and the genre of the game is the key to create the most suitable aesthetic type. The ambience comes from the combination of visuals and music. Different moments of the game require different ambiences. Appropriate ambiences stimulate players' feeling and make them fully concentrate on the game.

Story is another category of playability. It consists of two components: story and narrative. First, the quality of the story itself affect playability. Stories in games are similar to those in other medias. A few common and basic elements of the story are also found in the game during this study, including characters, setting, plot, conflict, resolution and theme. Characters are people, animals or other creatures in the story. The setting is the time and location in which the story happens. The plot is the cause-effect sequence of events in a story. All of actions that take place during the story belong to the plot. The conflict is the problem that the character attempt to resolve in the story. The resolution is the way to solve the conflict. It is the end of the story. The theme is the central idea or belief in the story. These elements affect the quality of the story. On the other hand, the way of telling the story is unique in the game. The player needs to experience the story themselves, instead of just being an audience. In the course of line by line coding, 60 comments are coded as story. Among them, 36 comments are related to the narrative. Hence, the narrative is important component for story. The narrative of the game is often conducted by dialogues, soliloquies, cut scenes or writings. Players receive the information about the story in the process of the narrative. This process has a little conflict with gameplay, since gameplay is the process of controlling and

interacting. As a result, interactive narrative and a good balance of the narrative and gameplay contribute to playability of the game.

7.2. Attributes of playability requirements

7.2.1. Variety

Variety is an important attribute of gameplay that contribute to playability. The purpose of variety is to reduce the sense of repetition, enrich the player experience and make the game engaging. In gameplay, game interaction and achievement of goals are both require variety.

Variety of Game interaction means that there are various ways of interaction between avatars and the game world. For Avatar, actions can be performed by avatars affect variety. In general, more actions can be taken in the game lead higher degree of variety. Three factors are found that contribute to variety actions during the study. First is tools that can be used by avatars, such as weapons, vehicles or items. Different tools can create various actions and change the way of interaction. For example, in the game review of Just Cause 3, the reviewer comments the game as follow:

“In a world teetering toward total destruction, Just Cause 3 grants you the tools to push it over the edge. The traditional grenades, remote mines, and numerous land, air, and sea vehicles are all on call in the rebel arsenal. *Then there's the tether: this grappling hook modification attaches two separate objects, and flings them toward each other, often with hilarious results. Rodriguez can reel enemies toward explosive barrels, collapse watchtowers, and pull attack helicopters into a fiery end. It's a testament to this game's creativity that guns were my last resort.*” [Mahardy, 2015]

According to this comments, Just Cause 3 provides a large number of tools that a player can use in the game. Among them, the reviewer highlights one tool, the tether. From the italic part of this comment, the use of the tether creates many ways of destruction and makes the game creative. The second factor is the skills or abilities of avatars, which become varying. For example, in the game Rise of the Tomb Raider, the game allows players to develop character's skills from three perspectives, including hunting, brawling and survival. Different skills have their own advantages, thereby lead to multiple styles of playing. The third factor is the types of avatars. In a few games, players can control multiple characters or select one from many different characters. Different characters can perform different actions. The difference enhances versatility of game playing. For example, the reviewer comments the game Crypt of the NecroDancer as follow:

“There are a bunch of other characters you can unlock and play as, each with unique twists that force you to play in different ways (with one character, for example, you get free items from shops, but picking up money kills you.” [Peele, 2015]

In Crypt of the NecroDancer, players can unlock and play many characters. Each character has its own distinct abilities. Different characters create different ways of playing.

On the aspect of Game world, variety is about the design of the virtual game world. The game world can be seen as a playground in which players are restricted to play. It is called level from in game design. Levels are constituted by structures and interactive entities. The structure means the structure of the space, such as a maze, a building or an area. Interactive entities are about encounters and environments. Encounters might be enemies, obstacles or pick-ups. And environments might be the wall that the avatar can climb or the rock that the avatar can cover. Through combing different entities and different structures, the game creates various levels and multiple ways of playing. Taking the review of the game Oblitus as an example:

“In less capable hands, such challenges might be overcome by simply memorizing where Oblitus' monsters enter and exit, and recalling precisely when to make various jumps. But this is Oblitus, a name that means “forgotten.” Ullmann's game escapes such predictability through the roguelike elements of its gameplay, which shakes up the locations and types of upgrades, health renewal boosts, and even a few of the enemies after each death to ensure that each playthrough differs from another.”

[Johnson, 2015]

As the reviewer said, random locations, pick-ups and different types of enemies make the game world variety. Hence, each playthrough is a new and fresh experience. In conclusion, for game interaction, variety can bring multiple play styles and offer different ways of playing. Multiple play styles and options of playing make the player feel freedom and in control, stave off dull repetition and keep the game experience fresh.

In the process of achieving goals, variety is reflected by the type of goals. Through the analysis, learning and challenge are considered as the basic type of the goal in video games, since players are required to learn and challenge in most games. Among them, various kinds of challenges contribute to the diversity. In this study, many types of challenges are found, such as destroying all the enemies and stealth. A few challenges test the physical skills of the player, such as hand-eye coordination or quick reactions. A few challenges require the player to observe and plan. A game often has a major challenge type and also offers other types of challenges as supplement. For example, for the game Half Minute Hero: The Second Coming, the reviewer comments the game as follow:

“Unlike the original game, which offered multiple game genres (real-time strategy, shooter, tower defense) creatively compressed into thirty-second chunks, The Second Coming is entirely based around the RPG-styled gameplay. The lack of clever gameplay variety compared to its predecessor is one of the biggest disappointments of The Second Coming, and I often found myself wishing I could switch to a different sort of 30-second adventure every so often like I could with the original.” [Kemps, 2014]

Half Minute Hero: The Second Coming is the sequel to Half Minute Hero. Except for RPG gameplay, the original game offers multiple game genres, including real-time strategy, shooter and tower defense. Multiple game genres create various challenge types. For example, shooter tests players' control accuracy, and tower defense tests the ability of resource planning and distribution. The reviewer disappointed about the sequel, since the game abandons multiple challenge types. Various challenge types can

create different gameplays, they avoid players feeling bored and keep the game engaging. In addition to learning and challenge, there are other types of goals in a game, such as exploration or collection. In addition to completing the major goal (beat the final boss or pass the main story line), self-development, collecting hidden treasures or challenge modified difficulty might become the goal of the player. A player often can not experience the whole content of the game. Through building different types of goals, the game motivates players to experience the game content as much as possible. Hence, various types of goals give players enough motivation to play, extend their game time and bring them an in-depth game experience.

7.2.2. Meaningfulness

Meaningfulness is another important attribute of gameplay. Each action from the player, completing a stage or a goal should be meaningful for the player. From the micro-terms, meaningfulness is reflected in the feedback of each action from the avatar. Motions like attacking enemies or opening chests requires clearly and satisfied sensory feedback. For example, in the review of the game *Hyper Light Drifter*, the reviewer comments the game as follow:

“With each drift, you leave a series of brief afterimages in your wake, which makes the mechanic inherently enjoyable.” [Vanord, 2016]

In *Hyper Light Drifter*, there is the visual feedback for each drift. A series of brief afterimages enhance the sense of movement, and let the player know the start and end points of each drift clearly, thereby making the drift meaningful. In terms of macro, meaningfulness is about rewards and the impact of gameplay and plot. When players beat enemies, pass a stage or complete a goal, they should get meaningful rewards. Rewards might be experience that can level up the avatar, new and powerful items that can be used by the avatar, skill points that can be used to develop new skills or strengthen available skills or uncovering unknown plots or information about the game. In order to make rewards meaningful, rewards should have a positive impact on gameplay or plots. For example, in the review of the game *Wolfenstein: The New Order*, the reviewer comments the game as follow:

“Outside of the perks system, weapon upgrades can be found throughout the game's levels and permanently attached to your guns. Assault rifles can be upgraded to fire underslung rockets, and shotguns can be made to fire shells that bounce off walls, effectively turning them into *Unreal Tournament's* flak cannon. The upgrades are useful, opening up new avenues for tactical approaches to taking down the tougher Nazi foes.” [Hindes, 2014]

In this game, weapon upgrades are rewards for players when they go through a level. Weapon upgrades can strengthen and evolve available weapons. Upgraded weapons have new and more powerful effects. As the reviewer said, these effects make upgrades useful and create new ways of playing. Thus, weapon upgrades are meaningful for players.

Meaningfulness is also important for learning of the game. Learning is considered as a kind of goal in this study. It is about the process of mastering a new skill or accessing new knowledge. This process is often drill and practice. Without meaningfulness,

learning might be boring and unmotivated. For example, the reviewer comments the game Downwell as follow:

“Learning the skills and vocabulary of the game gives you the confidence to risk chaining large combos, and it’s at this level where you can experience Downwell’s most exhilarating moments again and again.”
[Tran, 2015]

Downwell is a difficult game, learning the skills and vocabulary of the game is necessary for the player to complete the challenge. The result of learning stimulates players to play the game with risk chaining combos, which let learning meaningful. In addition, meaningfulness is key factor that contribute to variety. In a word, meaningfulness make variety effective. The avatar of a game might have various actions that can be performed, but if effects of them are similar or useless, then variety is pointless. For example, the reviewer comments the game Far Cry Primal as follow:

“The simple toolset serves the game’s themes well, but with enough time, it becomes clear how limited your loadout really is. In stealth scenarios, I rely on my silent bow. In open combat, I swing my club wildly. When hunting elk and grizzly bears, I use my spears. There are several more creative tools, but by and large, I find myself relying on the same simplistic options time after time.” [Mahardy, 2016 a]

As the reviewer said, there are a large number creative tools, but the use of them is limited by certain situations. As a result, most of tools become useless, the reviewer depends on fixed tools in the end, which make the game boring during a long game time. In this case, the importance of meaningfulness for variety is reflected obviously. In order to make players feel the real variety of the game, meaningfulness is indispensable.

7.2.3. Fairness

Fairness is an important attribute of achievement of goals. It represents reasonable difficulty and risk-return in achieving a goal. Difficulty of a game is an important factor that influence the learning. Steady ramping up of the difficulty is required for the game. If the difficulty of the game suddenly becomes very high or very low, players will feel frustrated or boring, then they will lose the interest of learning and the game. For example, in the review of the game Downwell, the reviewer comments the difficulty of the game as follow:

“The speed of the game is frustrating at first, and it’s tempting to try and take it slow, descending one platform at a time, making sure all enemies are clear, and taking a short breather before moving on. It’s also tempting to hold out for your favorite weapon module, one whose damage spread and ability to slow your descent matches your preferred playstyle. This works for the first few levels, but past the game’s first world, this calculated approach only causes even more frustration.” [Tran, 2015]

The game begins with the fast speed that make the reviewer feel frustrated. Then, the suddenly increased difficulty makes previous learning become pointless. On the other hand, many games with tough difficulty are found that receive high scores during this research. Based on the flow theory [Csikszentmihalyi, 1990], the appropriate balance between the difficulty and players’ skills is important for playability. In these games,

the relationship between the difficulty and players' skills is often out of balance. Failures or deaths are common for players. However, players still enjoy playing them. Through the analysis of game reviews, not only the appropriate balance between the difficulty and players' skills is required, but also the difficulty should be fair. Fair difficulty means the difficulty could be resolved by learning and practice. For example, the reviewer comments the difficulty of the game Dark Souls II as follow:

“I must give credit to Dark Souls II for making combat feel as fair as it does. The Souls games have always given you the tools to succeed, but while playing the newest entry, I was impressed by how it balanced new challenges with subtle ways to help you succeed. Sometimes, the path to success is relatively obvious, like using a lever to dunk baddies in boiling lava, or luring an armored turtle under a blade and watching the makeshift guillotine slice the half-shelled villain in two. Other possibilities are so subtle as to be obtuse, rewarding thorough investigation with an unexpected boon. Is poison complicating a battle against an evil queen? Is darkness inhibiting your ability to lock on to a pouncing behemoth? There might be some help out there, just hidden from view. Dark Souls II trusts you to find it--or if not, to overcome without it.” [Vanord, 2014]

The reviewer says the game always give you tools to succeed, from obvious to subtle. Although the game is ultra difficulty, it is not undefeatable. Each tough challenge contains a few patterns or laws and players can overcome the challenge by learning those patterns or laws. Concrete and visible possibility of the success motivate players to keep playing, and the high difficulty also satisfied their self-esteem. In contrast, in a few games, high difficulty only depends on chaos. The game increases the difficulty through adding a large number of enemies and obstacles, which make the challenge look invincible. In this situation, players feel unfair for such high difficulty, since they can only rely on the luck.

In addition to the difficulty, risk-return in the game also affect fairness. The game should reward players based on the effort and risk they pay. The player should feel worth paying for them. For example, in the game Downwell, the game's combo system drive players to play fast and risky. A combo means to kill enemies without touching the ground constantly. The game will reward players increased ammo capacity and corresponding currency that can be used at upgrade stores. In addition, the character has a limit number of shots. Players can maintain a long combo by jumping on enemies, since jumping on enemies refreshes the ammo and avoiding players run out of shots. These mechanics ensure risk-return in the game reasonable. Though completing a series of combos is difficulty and risky, particularly cool feeling and rich rewards make it worth pursuing. On the other hand, unreasonable punishments have a bad effect on fairness. In the game Grow Home, the reviewer comments this game as follow:

“This was never frustrating for me, but I can see how it might be for others. Maybe you misjudge the amount of momentum BUD will have as he lands on one of the "branches" of the massive stalk, and wind up flinging him thousands of feet down to his demise. Or you might think you've got a firm grip on the cliff face, only to find that you've actually grabbed onto a loose boulder. Whoops. You can supplement your control of BUD with some environmental tools: springy plants give you a way to boost BUD's jumping power, while flowers and leaves work as parachutes

and hang gliders. But these often lead to other stumbles. Pro tip: if you crash into anything while floating around with that leaf, you lose hold of it and go into a headfirst dive. Whoops, again.” [Walker, 2015]

In *Grow Home*, players might receive heavy punishments due to a few small mistakes. The loss of a large part of the game progress make players feel unfair and frustrated. As a result, players might lose patient for the game and drop the game off. The game does need punishments. Without punishments, the game might be lack of tension. Appropriate punishments make success more precious. For example, in the game *Jotun*, the character can be killed in the game, but the game gives infinite tries to players. When the character is killed by the boss, the character rebirth right at the boss with full states and powers. This game punishes players by deaths, but the degree of punishments is well-controlled. As the reviewer says, “the game will not coddle, and every victory will be well-earned beyond a shadow of a doubt.”

7.2.4. Pace

Pace is about the speed and the time of performing a series actions or achieving goals in the game. It depends on the frequency of players’ manipulations, effort of completing goals and the distribution of different goals. The frequency of players’ manipulations often depends on the game genre. For the action game, fast pace gameplay is preferred by players, which leads to tense and compact manipulations from players. For example, the reviewer commends the speedy combat of the game *Crypt of the NecroDancer* as follow:

“You have to keep moving with the music, so you have no time to think about what you did wrong or how to recover from it. You move the wrong way, taking another hit--your last. You kick yourself for losing all that gold and all those items, but you restart the game, hoping to do better next time. The catch is that you have to do all this in time with the floor's music--and if the song ends, you move deeper into the floor whether you're ready or not.” [Peele, 2015]

Players are required to keep making moves and reactions with the beat constantly and quickly in *NecroDancer*. Though the fast pace might lead a few reckless moves, it makes the game full of fun and tension. Players are engaged to play the game repeatedly. In addition, the design of the goal in the game also affect pace of the game. For a single goal, required effort from players for completing a goal affect game pace. The effort is determined by two factors, time and difficulty. Time is the length of time takes the player to complete a goal. Difficulty is the change of difficulty during the process of achieving a goal. There is not a defined formula for designing the pace of completing a goal, since pace highly depends on players’ feeling. Generally, a well-paced goal has appropriate balance between tension and relaxation. For example, in the game *Hyper Light Drifter*, the reviewer comments pace of the game as follow:

“It is more than simply pretty; *Hyper Light Drifter* uses its visuals to both guide and relax you. The grandest vistas calm your pulse between difficult, breathless combat sequences. Developer Heart Machine applies to its visuals a lesson music composers learn early in their studies: rests are as important as notes. Heart Machine uses the number of notes required, no fewer and no more; during the rests, you explore the world, looking for secrets and valuable health packs. You take in sights such as a

colossal mechanical hand--iced over, disembodied--and wonder about the titan it belonged to.” [Vanord, 2016]

Difficult and quick combat make the game full of tension. Tension helps players concentrate on the game deeply. However, players will be tired if they maintain a high degree of tension for a long time. Hyper Light Drifter offers players appropriate rest time after an intense combat. During the rest time, players can explore the world with easy tasks and enjoyable music. This balance makes the game fantastic. In terms of a series of multilevel goals, pace depends on the connection and balance between different goals. A game has long-term goals and short-term goals. The type of the goal also might be divided into the main goal and side goal. The game needs to provide expected pace to players by planning those goals. For instance, in the game *The Incredible Adventures of Van Helsing II*, different goals are well planned and structured. The reviewer comments the design of different goals as follow:

“You don't have to deal with the big things immediately if you don't want to, though. Like before, there are plenty of supplementary quests for those looking for a break from the core game. The tower-defense minigame makes a return, with robust tools for managing waves and waves of baddies. You can also hire soldiers, upgrade their equipment, and build up a small army to run consistent raids for you. They can bring back valuable items and tons of extra cash, which you can reinvest in your war effort, or yourself. Various non-player characters also offer additional one-off quests that help further build out this surprisingly rich world, and yield some great loot for you and your companions. Finally, you also have some shops and crafting tools to help you get the best gear and tools for combat versus the weird, surreal, and undead monsters that roam the wilds outside of Borgova.” [Starkey, 2014]

The reviewer describes main and difficult goals as big things and calls side goals as supplementary quests. Players can directly challenge the big things or complete supplementary quests firstly. Supplementary quests give players extra cash and valuable items that are helpful for the big things. The freedom of choosing different goals let players decide the appropriate pace for themselves.

7.2.5. Intuitiveness

Intuitiveness is a key attribute for the game control. Oxford Dictionary of English [Stevenson, 2010] explains intuitiveness as “using or based on what feels to be true even without conscious reasoning”. Intuitiveness for the game control is similar with this explanation. The purpose of intuitiveness is to allow players control avatars to perform actions without conscious reasoning.

The game control is about how players control avatars, it includes two aspects: control mappings and the process of controlling. Control mappings are rules of mapping hardware inputs to virtual actions in the game. In order to achieve intuitive controls, control mappings should be straightforward. For instance, in *Downwell*, players control the avatar by only three buttons: left button, right button and action button. Left and right buttons control the basic movement of the avatar. The action button represents the jump action while the avatar is on the ground, and the fire action while the avatar is in the middle of the air. Though control mappings of the game are simple, the game is

tactical and challenging. Players are required to make the quick decision on each movement based on the situation and switch actions between jump and fire. Straightforward controls make the game easy to pickup and play. In contrast, complex control mappings bring players bad experiences. In the game *Crypt of the NecroDancer*, a few actions need to be performed by pressing two buttons simultaneously. For example, the player can drop the bomb by pressing down and left buttons at the same time. The two button combinations are easily mixed up by players. As the reviewer complains about these controls:

“if your finger slips and you only hit one of the buttons instead of two, you can very easily lose your coin multiplier--or worse.” [Peele, 2015]

The complex button combinations are hard to memory and destroy intuitiveness of the game control. In addition, the process of controlling should be smooth and accurate. If the process of controlling is unpredictable and lack of accuracy, players still feel suffering even with straightforward control mappings. For example, the reviewer comments controls of the game *Gravity Ghost* as follow:

“Leaping back and forth between the gravity wells to collect the stars and flowers and ghosts and power-ups isn't always the smoothest experience, but the game gives you a host of tools to circumnavigate most potential sources of frustration, except in timed segments where the looseness of the gravity physics can become aggravating.” [Saas, 2015]

The looseness of the gravity physics makes movements of the avatar a little out of control. The unpredictable distance and height of leaping make the game control uncontrollable, thereby increasing the amount of the mistake in the process of controlling. Hence, players might feel frustrated due to uncontrollable mistakes.

8. Discussion

On the basis of the commercial game review analysis of 41 games on GameSpot, we identified three game components that contribute to playability. They are Gameplay, Representation and Story. This study focuses on the category of Gameplay, and attributes of gameplay are concluded through data analysis. As a result, the use of playability framework mainly focuses on analyzing gameplay requirements based on player feedback.

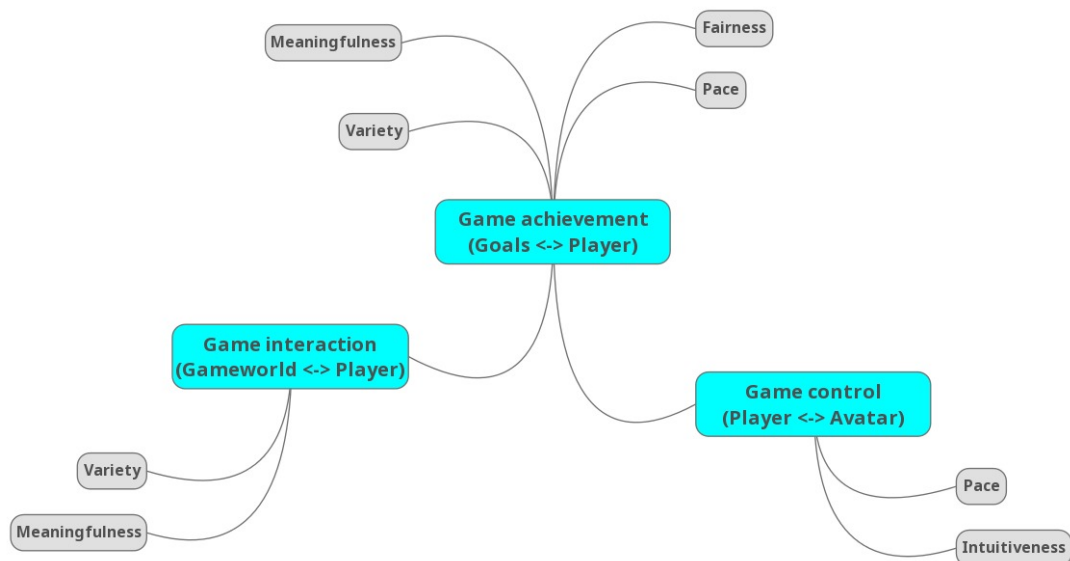


Figure 13. A mind map of Gameplay

According to Figure 13, Gameplay consists of components: Player, Avatar, Game world and Goals. The relationship between these four components classifies gameplay into three categories, including Goal achievement, Game interaction and Game control. In addition, each category has corresponding attributes. For example, Fairness is the attributes of goal achievement. And different categories might have same attributes with different meanings. For example, Meaningfulness for Game interaction related to sensory feedback. For Goal achievement, it refers to rewards and punishments. Based on the framework and attributes of gameplay, three steps for analyzing and managing gameplay requirements from player feedback is generated, shown in Figure 13.

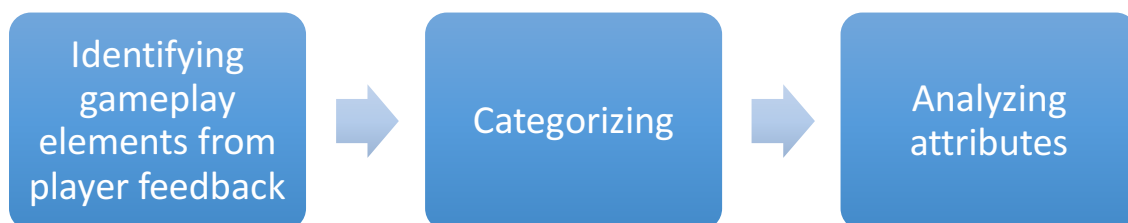


Figure 14. Three steps for analyzing and managing gameplay requirements.

First step is to recognize player feedback that belong to gameplay requirements. Then, player feedback that belongs to gameplay should be classified based on the categories

of gameplay. In the last step, which attributes can be discovered from player feedback needs to be considered. Figure 14 shows a user review from Metacritic [Metacritic, 2017] website. In order to explain the use of three steps specifically, gameplay requirements are analyzed and managed from this user review.

First, three parts of the user review are identified as being relevant to gameplay, which are marked in Figure 14. Then, categories of gameplay and attributes of the three parts should be analyzed. The first part is about the flying mechanic of the game. The user believed it is not good enough, since the flying mechanic make exploration loss of the challenge. Exploration is a type of the goal in the game, flying mechanic reduce the difficulty of the exploration. Consequently, this part can be categorized as goal achievement and the attribute is fairness. The second part is about the keyboard controls. The control mappings of the game make the user uncomfortable. Too many actions are binding into one key that make the game control annoying. Accordingly, this part is categorized as game control and the attribute is intuitiveness. The third part is about the combat. The shooting action lacks accuracy and the throw trajectory is not consistent with common sense. The process of shooting enemies is the interaction between the player and the game world. The bad accuracy and throw trajectory is related to the sensory feedback. Accordingly, this part belongs to game interaction and the attribute is meaningfulness. Through the analysis, the three parts are categorized and symbolized by attributes. The final result of the analysis is documented in Table 8.

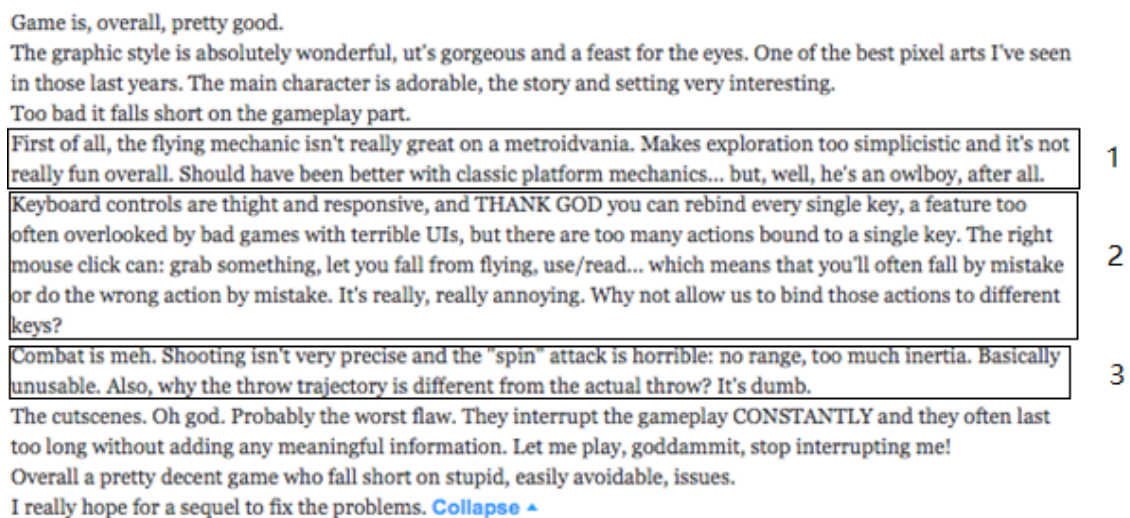


Figure 15. A user review from Metacritic website.

The three steps can help game designers or testers to analyze gameplay requirements from player feedback systematically. With the three steps, the reasons and related game components can be analyzed. Game designers or testers can locate and address the related issues more accurately and effectively. They also can be used to analyze other types of playability requirements. For example, for representation requirements, the first step is identifying player feedback related to representation. Then, identified player feedback should be corresponded to specific categories of representation. The last step is to analyze attributes of representation from identified player feedback. However, in this research, representation is not broken down into specific categories and attributes of representation are also not concluded. They still need to be studied in the future.

Player feedback	Category	Attributes
“First of all, the flying mechanic isn't really great on a metroidvania. Makes exploration too simplistic and it's not really fun overall. Should have been better with classic platform mechanics... but, well, he's an owlboy, after all.”	Goal achievement	Fairness
“Keyboard controls are tight and responsive, and THANK GOD you can rebind every single key, a feature too often overlooked by bad games with terrible UIs, but there are too many actions bound to a single key. The right mouse click can: grab something, let you fall from flying, use/read... which means that you'll often fall by mistake or do the wrong action by mistake. It's really, really annoying. Why not allow us to bind those actions to different keys?”	Game control	Intuitiveness
“Combat is meh. Shooting isn't very precise and the "spin" attack is horrible: no range, too much inertia. Basically unusable. Also, why the throw trajectory is different from the actual throw? It's dumb.”	Game interaction	Meaningfulness

Table 8. The result of the analysis

Using game heuristics is also a method for analyzing playability requirements from the player feedback. There were some kinds of game heuristics [Desurvire et al., 2004; Korhonen and Koivisto, 2006] that were developed by different researchers. Game heuristics are a list of principles specifically for game evaluation. Although they can be considered as guidelines for game design, they lack connections with the game development. In addition, heuristics are always defined previously, so that it is hard to change for a specific game. In contrast, gameplay requirements can be changed and developed based on the structure, as shown in Table 8. The structure consists of player feedback, categories of gameplay and attributes. Gameplay requirements can be documented according the structure, as shown in Table 8. The categories associate requirements with specific design components of gameplay, including game interaction, goal achievement and game control. During the process of game development, gameplay of a game would be changed very frequently based on designers' ideas and different kinds of tests. These changes come from new requirements or unsatisfied requirements. However, the changes are not often documented systematically during the development. As the form shows in Table 8, the changes can be documented as a series of gameplay requirements. The requirements can be sorted out by categories of gameplay or attributes. In this way, the changes can be tracked easily. Both designers and testers could understand the reason of changes and refine the game based on the well documented gameplay requirements. Moreover, the documented requirements also can be guidelines for game designers or testers to implement the later work. As a result, the structure contributes to the management of gameplay requirements, and ensure the value of game development.

9. Conclusion

In this research, the playability framework is developed for analyzing and managing playability requirements based on player feedback. The research is conducted by the grounded theory, which is a qualitative and empirical research method. A total of 41 game reviews from Gamespot are collected and analyzed. Through coding, memo-writing and theoretical sampling, the final result is generated.

First, through coding the verdicts from 41 game reviews, playability was categorized into three categories: Gameplay, Representation and Story. This thesis focuses on Gameplay, since most of research data belong to Gameplay. Meanwhile, similar attributes that affect Gameplay were concluded, including Variety, Meaningfulness, Fairness, Pace and Intuitiveness. Next, further data (the full written reviews) was collected and analyzed. Gameplay was breakdown into four elements, including Player, Avatar, Gameworld and Goals. Three categories of Gameplay were also developed by analyzing the relationships between the four elements, they are Goal achievement, Game interaction and Game control. Five attributes of Gameplay were defined and discussed in detail. As a result, Playability Framework was developed based on the elements, the categories and the attributes. Based on Playability Framework, the steps of analyzing playability requirements were generated and the form of playability requirements was also defined.

In addition, there are still a few limitations in this research. First, this research mainly focuses on gameplay of playability. Although gameplay is a major category of playability, representation and story are also important for playability. Researches for them are still required. The second, this thesis identifies five common attributes of gameplay, but attributes of gameplay are not limited on them. Different game products developed by different game designers might require other attributes of gameplay. The third, the research data is limited to the single player action game on PC platform. The playability framework might not be comprehensive for other types of games or games on other platforms, such as the multiplayer game or the mobile game. The last but not all, the lack of literature referred to RE in regards of games also limits this study. The study did not go deep from the perspective of RE. Although there are a few limitations, the concept of playability requirements was developed in this study. The result can help game designers or testers analyze and manage the player feedback on playability in the form of non-functional requirements

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Appendix 1_Game list

Number	Game name
N1	The Witcher 3: Wild Hunt
N2	Dark Souls 2
N3	Hotline Miami 2: Wrong Number
N4	SOMA
N5	The Walking Dead: Season Two - A Telltale Games Series
N6	Grand Theft Auto V
N7	Metal Gear Rising: Revengeance
N8	BioShock Infinite
N9	Rise of the Tomb Raider
N10	Hyper Light Drifter
N11	Apotheon
N12	The Binding of Isaac: Rebirth
N13	A Bird Story
N14	Transistor
N15	Wolfenstein: The New Order
N16	Life Goes On
N17	Valiant Hearts: The Great War
N18	The Walking Dead: Season Two Episode 2 - A House Divided Review
N19	The Flame in the Flood
N20	Volume
N21	The Aquatic Adventure of the Last Human
N22	Grim Dawn
N23	The Incredible Adventures of Van Helsing II
N24	Resident Evil 4
N25	Tower of Guns
N26	Oxenfree
N27	Half Minute Hero: The Second Coming
N28	Fenix Rage
N29	The Escapists
N30	Crypt of the NecroDancer
N31	Five Nights at Freddy's
N32	Gravity Ghost
N33	Just Cause 3
N34	Lost Constellation
N35	Grow Home
N36	Oblitus
N37	Republique

N38	Jotun
N39	Downwell
N40	Far Cry Primal
N41	SUPERHOT

Appendix 2_Line by line coding

Gameplay:

Game Num	Data from the verdict	Categories
1	There's so much to do--almost all of it brimming with quality	gameplay
1	Armor designs, potion system, and sign upgrades provide an excellent sense of growth	gameplay
1	Fantastic detailing reveals the consequences of your actions	gameplay
2	Tons of cool, creepy, challenging bosses	gameplay
2	Lots of tweaks to the Dark Souls formula that make exploration and combat consistently rewarding	gameplay
2	Fantastic sense of discovery	gameplay
2	Gives you minimal guidance and trusts you to triumph on your own terms	gameplay
3	Plenty of level and character variety	gameplay
3	Finely tuned controls encourage recklessness	gameplay
3	Surprisingly long story and challenging hard mode	gameplay
4	Enemy encounters can be tedious	gameplay
4	Walking the ocean floor is dull and plodding	gameplay
4	Keeps you on the edge of your seat	gameplay
5	Constant zombie attacks make for more action sequences than in other recent episodes	gameplay
5	Clementine's dialogue choices are now more frequent and more meaningful	gameplay
6	Los Santos is the ideal virtual playground for anarchy	gameplay
6	The excellent first-person mode makes for a very different experience	gameplay
6	Thrilling heist missions	gameplay
6	First-person doesn't work so well for vehicles	gameplay
7	The fast-paced combat excites your reflexes	gameplay
7	Decimating environments is a guilty pleasure that never gets old	gameplay
7	Depth and accessibility coexist in harmony	gameplay
8	Well-paced, stealth-focused gameplay is a great fit for the setting	gameplay
8	Makes smart connections between story and gameplay	gameplay
8	Exploring Rapture is tense but not unforgiving	gameplay
9	Engaging combat scenarios	gameplay
9	Tedious resource gathering	gameplay
9	Excellent crafting and upgrade system	gameplay
10	Fantastic balance of exploration and action	gameplay
10	Fun, challenging combat encourages speed over force	gameplay

10	Lots of secrets and hidden areas to discover	gameplay
10	Great boss fights	gameplay
11	Limited combat options leads to monotony towards the end	gameplay
12	Random levels and varied room and monster styles keep things fresh for each play	gameplay
12	Loads of different power-ups, monsters, secrets, and more	gameplay
12	Spectacularly speedy gameplay	gameplay
12	Old-school arcade shooting done extremely well	gameplay
13	Limited interactivity used only when it counts most	gameplay
14	Empowering combat system that fuses real-time and turn-based action	gameplay
15	A simple but effective stealth approach	gameplay
15	Laser cutter can't be used creatively	gameplay
15	Big, loud guns with excellent feedback	gameplay
15	Inconsequential perks system	gameplay
15	Old-school combat mechanics are a refreshing change of pace	gameplay
16	Clever puzzles, fun platforming	gameplay
16	Some ideas are repeated too often	gameplay
16	Inspired self-sacrifice concept	gameplay
17	Engaging puzzles and imaginative scenarios *	gameplay
17	Refreshing emphasis on helping people in wartime rather than killing them	gameplay
19	Grounded survival simulation that emphasises necessity	gameplay
20	Inventive level design and tight mechanics combine to create an intelligent stealth game	gameplay
20	Visual cues provide the necessary hints without immediately offering a solution	gameplay
20	Player movement sometimes continues after you want it to stop	gameplay
21	Fantastic boss battles reward your concentration and planning	gameplay
21	Some lethal obstacles are difficult to discern during combat	gameplay
22	Impressive range of character classes and skill development	gameplay
22	Small inventory space is at odds with the heavy flow of loot	gameplay
22	Great rhythm and balance between speedy combat, loot drops, and plot points	gameplay
22	Combat grows monotonous over time	gameplay
22	Nails the action RPG formula just about perfectly	gameplay
22	Expansive solo campaign	gameplay
23	Dense environments that give you plenty to do	gameplay
23	Quick, rewarding combat	gameplay
24	Tense action and exploration	gameplay
25	Engaging action	gameplay
25	Randomized levels and perks make each attempt unique	gameplay

25	Well-hidden secret caches scratch the itch for exploration	gameplay
25	Some incomplete level design and patchy collision detection	gameplay
26	No rewind feature to isolate individual choices on repeated playthroughs	gameplay
26	Player choice consistently has deep impact on the story	gameplay
27	Lacks the gameplay variety of the original	gameplay
27	Fast-paced gameplay puts a fun and challenging spin on RPG mechanics	gameplay
27	Lots of hidden secrets to sniff out	gameplay
28	Novel platforming mechanics	gameplay
28	Lots of reasons to return	gameplay
28	Fun, fair, hard-as-hell challenges	gameplay
28	Later levels can frustrate	gameplay
29	Multiple ways to break out	gameplay
29	Executing a successful prison break is fantastic	gameplay
29	Challenging, but incredibly rewarding	gameplay
30	Lots of variety across different characters	gameplay
30	Fun twist on standard roguelike gameplay	gameplay
30	Sense of new item discovery is over too quickly	gameplay
30	Catchy beats are a joy to move with	gameplay
30	Default controls take some adjustment	gameplay
31	The "game over" jump scare wears out its welcome	gameplay
31	Extremely short length	gameplay
31	Steady ramping up of difficulty	gameplay
32	Clever level design makes constantly tweaking core orbital physics fun	gameplay
32	A handful of levels are too short and simple	gameplay
32	Controls occasionally lack tightness for trickier levels	gameplay
33	Numerous options for destructive experimentation	gameplay
33	Weak, repetitive scripted missions	gameplay
33	Challenges well worth pursuing	gameplay
33	Destructible environments create a power fantasy	gameplay
33	Smooth, fluid traversal controls	gameplay
33	Bugs, bad AI, and other technical problems	gameplay
34	Being able to create your own snowman enhances emotional investment	gameplay
35	Encourages you to explore at your own pace	gameplay
35	Platforming challenges can occasionally prove frustrating	gameplay
35	Unique animation system gives the protagonist real character	gameplay
35	Controls make moving around the world a joy	gameplay
35	No easy way to track down that one, last collectible	gameplay

36	Shuffling of upgrades and enemies after death keeps playthroughs fresh	gameplay
36	Compact world design keeps constant replays bearable	gameplay
36	Not always clear if environmental elements can be walked on or not	gameplay
36	Accessible, intuitive controls	gameplay
37	Simple, intuitive and fun stealth gameplay	gameplay
37	Lacks in tension due to the inability to fail	gameplay
38	Fantastic boss battles	gameplay
38	Some mild, tedious backtracking	gameplay
38	Tough but mostly fair challenge	gameplay
39	Fast-paced action keeps you coming back despite failure.	gameplay
39	Teaches and encourages enjoyable, risky play.	gameplay
39	Mechanics and presentation are both captivatingly stark.	gameplay
39	Initial experiences can be frustrating.	gameplay
40	Limited weapon set	gameplay
40	Repetitive combat	gameplay
40	Creative Beast Master abilities	gameplay
40	Tense focus on survival	gameplay
41	Excellent gameplay twist	gameplay
41	Packed with curious oddities	gameplay
41	Too many levels rely on rote behavior	gameplay

Representation:

1	Phenomenal, beautiful open world that juxtaposes violence with beauty	Representation
11	Unique art style sells the narrative	Representation
13	Ridiculous artistic mileage from simple 16-bit art style	Representation
13	Beautiful, heartbreaking score	Representation
14	Visuals, music, and writing combine to create some terrific moments	Representation
16	Packed with personality and charm	Representation
17	Gorgeous visuals full of lively details	Representation
17	Some other minor inconsistencies and weak moments	Representation
2	Flat lighting makes some areas look too washed out	Representation
2	Fantastic sense of discovery	Representation
23	Dense environments that give you plenty to do	Representation
24	Fantastic atmosphere	Representation

27	Excellent soundtrack with contributions from numerous well-known composers	Representation
3	Incredible soundtrack	Representation
30	Catchy beats are a joy to move with	Representation
31	Dark but persistent humor provides a nice contrast	Representation
31	Story delivered in small but terrifying background details	Representation
32	Subtle yet stirring musical score	Representation
32	Beautiful art ripped out of the pages of a children's book	Representation
34	Lovely visuals create a sense of mystery and wonder	Representation
35	Gorgeous, cel shaded environments	Representation
36	Excellent soundtrack	Representation
37	Great example of environmental storytelling	Representation
38	Wonderfully imagined take on Norse mythology	Representation
38	Beautiful hand drawn art	Representation
39	Mechanics and presentation are both captivatingly stark.	Representation
4	The atmosphere is drenched in dread	Representation
4	Sound design is particularly chilling	Representation
5	Very, very bleak	Representation
6	Los Santos is the ideal virtual playground for anarchy	Representation
6	Stunning visuals	Representation
7	Most environmental palettes lack variety	Representation
9	Gorgeous world worth exploring	Representation
10	Skillfully depicts a colorful, beautiful, ruined world	Representation
10	Great boss fights	Representation
10	Sense of perspective can sometimes confuse	Representation
21	A great soundtrack compliments the game's atmosphere	Representation
21	Inconsistent art style	Representation
22	Beautifully realized visuals loaded with eerie details	Representation
19	Excellent Americana soundtrack	Representation
19	Beautiful art direction	Representation
26	Excellent soundtrack draped all in a 1980s teen-flick aesthetic	Representation

Story:

1	Absorbing story wonderfully balances world politics and personal conflict	story
11	Masterfully recreates classic Greek tragedy in a modern form	story
11	Bouts with gods often have twists, making them both much more believable and tangible	story
12	Rather disturbing, especially in the beginning	story
13	Predictable plot developments	story
13	Minimalistic, dreamlike story expertly told	story
14	Visuals, music, and writing combine to create some terrific moments	story
14	Fascinating and unconventional narrative that exudes confidence	story
16	Packed with personality and charm	story
17	Anna is a great character	story
17	Freddie's storyline is cliché	story
17	Some powerful depictions of the human cost of war	story
17	Some other minor inconsistencies and weak moments	story
17	Engaging puzzles and imaginative scenarios *	story
17	Refreshing emphasis on helping people in wartime rather than killing them	story
18	Absorbing plot that turns into one long existential crisis	story
18	Unrelenting brutality swerves too close to self-parody	story
18	Introduces a promising new villain that could rank with the Governor and Negan in the Walking Dead franchise's rogues' gallery	story
18	More of a self-contained, satisfying story than the first episode of season two	story
20	Fantastic voice acting	story
20	Intrusive storytelling gets in the way of gameplay	story
23	After the introduction, it really opens up	story
23	Excellent world-building*	story
23	Agonizingly slow start	story
23	Awkward, cluttered narrative	story
24	Ada's missions use poor-quality cutscenes, causing irritating issues	story
27	Gets way too wordy at times, slowing the pace	story
27	Full of amusing parodies and references to famous RPG scenes and tropes	story
29	Executing a successful prison break is fantastic	story
3	Convoluting story is initially laid on thick	story

3	Surprisingly long story and challenging hard mode	story
30	The shopkeeper's soothing voice	story
31	Dark but persistent humor provides a nice contrast	story
31	Story delivered in small but terrifying background details	story
31	Heart-pounding terror that never resorts to gore	story
32	Strong writing	story
34	Enchanting dialogue and characters	story
37	Excellent voice acting	story
37	Great example of environmental storytelling	story
37	Frequent hat tips to its Kickstarter roots kill immersion	story
37	Compelling, engaging, well-plotted mystery	story
38	Wonderfully imagined take on Norse mythology	story
4	Impressive writing and voice acting throughout	story
4	Engaging and thought-provoking story	story
5	Fascinating character development with Clementine, as she becomes more pragmatic and even accustomed to watching her friends die	story
5	Clementine's dialogue choices are now more frequent and more meaningful	story
5	Tense, fast-moving, and tightly plotted storyline	story
6	The best writing and voice acting you'll see in a video game	story
7	Raiden's intriguing personal story justifies his return to the spotlight	story
7	The predictably political plot fails to excite	story
8	Fontaine is an excellent villain	story
8	Some overly contrived plot points and metaphors	story
8	Makes smart connections between story and gameplay	story
9	Well written story and characters	story
21	Audio tapes tell an engaging story	story
40	Cohesive, foreboding world	story
22	Great rhythm and balance between speedy combat, loot drops, and plot points	story
41	Deviously dark narrative	story
26	Dialogue flows beautifully and includes very humorous banter	story
26	Story is unpredictable and unravels subtly	story

Appendix 3_Memo-writing

Variety:

Variety is about various ways for players to interact with environmental objects or encounters in the virtual game world. It creates multiple options for playing styles.

Variety might be affected by tools, levels, and goals of the game

Multiple options for player styles

Tools. (Character classes and skills)

Variety of tools the players can use in the games.

Level, or map.

Ultimate goal: Multiple strategies or ways of finishing a goal, figuring out a puzzle or winning the fight. Multiple gameplay.

Varied experience, engaging,

Num	Data from the verdict	Attributes	Data from the full written review

1	There's so much to do-- almost all of it brimming with quality	variety, efficiency	<p>From one hour to the next, the compulsion to examine the landscape grows. Some of the joys that arise in the wilds are quiet ones: you mount your horse Roach and trot over the hill in time to see a rich sunset, always a treat in <i>The Witcher 3</i>, whose saturated reds and oranges make the sky look as beautiful and as blood-sodden as the meadows beneath them. You discover a boat and embark on an impromptu voyage through the islands of Skellige, taking note of the ship wreckage that mars the beaches and cliffs. The music swells, and a soprano intones a euphoric melody that accentuates the peacefulness. The peacefulness is always broken, however--perhaps by a journey into a dark dungeon where your torch lights the pockmarked walls and a snarling fiend waits to devour you, or by the shout of a boy crying out for your assistance. <i>The Witcher 3</i> also benefits from its hugely expanded potions system, which allows you to quaff potions during combat--though as always, witcher potions are dangerous, and Geralt can only have so many in effect due to their rising toxicity. Between gear diagrams and potion ingredients, I became a digital hoarder, a trap I typically avoid in role-playing games. Again, it comes down to balance: your inventory fills rapidly, but for the most part, this is not just "stuff" for the sake of "stuff." I knew that the ingredients I collected would allow me to create a potion that in turn let me dive for treasure without being annoyed by pesky seawelling drowners. I knew that I could break down those horse hides I collected into armor components the local smith needed to make me look even mightier.</p>
1	Armor designs, potion system, and sign upgrades provide an excellent sense of growth	variety, feedback	<p>Loot has a huge role to play in the game, thanks to the high degree of armor and weapon customization. Different armor sets in particular are a joy to uncover, making Geralt look more and more hardened as you progress. In many role-playing games, hunting for treasure is more of a chore to be marked off of the to-do list than a pressing adventure of its own. In <i>The Witcher 3</i>, discovering a diagram of new and improved chest armor is a cause for celebration. Geralt can get a shave and a haircut (and delightfully, his beard grows back over time), but otherwise, you cannot customize his physical appearance; new armor means a new look, and with it, a new visual attitude. Geralt's look evolves from that of a battered soldier, to robed</p>

			battle wizard, to wisened commander, all on the basis of the game's exquisite armor designs.
2	Tons of cool, creepy, challenging bosses	variety, challenge, fantasy	
2	Lots of tweaks to the Dark Souls formula that make exploration and combat consistently rewarding	variety, feedback	These changes might not have worked had Dark Souls II not made discovery such a thrill, but with each new area comes a new wondrous vista and a new challenge to overcome. The early forests and ruins are very Dark Souls, but the intricate architecture and carefully planned enemy locations make even familiar-looking environments fresh and unique. The more progress you make, however, the more unusual the settings become, and the more you need to consider new methods of approach. Suddenly, undead freaks are flinging themselves to the ground and exploding, and so you must hasten your rhythm. You walk through an archway and into the thickest fog imaginable, where you cannot lock on to the ghostly shimmers that attack you. Poison rains from the sky, bedeviled urns curse you when you linger near, and anthropomorphic tortoises stop, drop, and roll all over your puny body. Dark Souls II wants to kill you, but the cycle of death and rebirth is worth it if it means finding the royal ring that lets you open that giant door and discover what new and wonderful lands lie beyond it.
4	Enemy encounters can be tedious	variety	I found most of these interactions to be rather tedious affairs,

5	Constant zombie attacks make for more action sequences than in other recent episodes	variety, challenge	The focus remains on Clem, largely due to a tremendous number of twitch action sequences where you have to dodge and kill zombies with button mashing. Zombies attack constantly, which is a refreshing change from prior episodes, where long stretches would go by without your having to do so much as respond to a question or shove a dresser in front of a door. In this episode, the whole gang is menaced, from the frenetic opening escape from Carver through to the zombie wave assault waged on the Civil War site gift shop just as Rebecca goes into labor.
9	Engaging combat scenarios	variety, fantasy, flexibility	And when it comes to combat, Rise of the The Tomb Raider is superb. The variety of options available in any given firefight is staggering. In fact, these encounters often feel more like puzzles. At one point, Rise of the Tomb Raider stages a battle on a frozen pond. Eight guards with heavy armor present a serious challenge, but by using the water, several holes in the ice, and the weapons at my disposal, I could even the odds. It was such an engaging encounter, I reloaded my checkpoint just to play it again. This game is filled with chances to experiment.
11	Limited combat options leads to monotony towards the end	variety	Your weapons and shields also have limited durability. At best, a spear lasts you a few small battles. There are no flaming chain blades here. Instead, you have a small assortment of conventional blades, axes, and pikes. Shields can cover only a limited part of your body so you also have to predict the direction of incoming strikes. It's similar to a two-dimensional Dark Souls in that respect. Unfortunately, that lack of depth is one of the few knocks against Apotheon. Repeating the block-wait-attack tactic for ten hours gets thin. The only respite is the bouts with the gods themselves.
12	Random levels and varied room and monster styles keep things fresh for each play	variety, pace	Beyond all the insanity, Rebirth is a fantastic arcade shooter. Combat speed, a variety of enemies, and alternating types of rooms keep you off-kilter just enough so that the game never gets repetitive. One moment, you're taking on blackened babies in a huge cavern, and the next, you're dealing with poisonous slugs in a cramped room loaded with obstacles.

12	Loads of different power-ups, monsters, secrets, and more	variety	<p>McMillen really brings the weird when the game gets rolling. Isaac's health is tracked with hearts (you start with just three, and new ones are few and far between in the game), and his only weapon is his tears, which form into watery bullets. The basement and cave levels below the house are disturbingly filled with big piles of swirly cartoon poop (that comes in all shapes, sizes, and colors) and poop-related monsters like anthropomorphic piles of crap that fling smaller piles of crap at you and all sorts of related creepy crawlies like flies, spiders, slugs, and so forth, along with demon spawn like animated dead babies (that frequently explode when killed, spraying bloody viscera all over the place). Power-ups are equally loony-tunes. There are hundreds of these goodies in the game, some passive, some active, and all are surreal, blasphemous, or an inventively sick combination of the two. Isaac can pick up the Stigmata power-up and start shooting more powerful bloody tears. The Black Bean causes Isaac to spew toxic fart clouds whenever he is attacked. A Placenta boosts health. The severed heads of various pets provide all kinds of buffs, as do Tarot cards, evil books, and so forth. Cancer gives you -- ah, I don't even know or want to know. It was enough for me to see Isaac shout, "Yay, cancer!" when he picked it up.</p>
15	A simple but effective stealth approach	variety, pace, fantasy	<p>Some rudimentary yet functional stealth mechanics allow The New Order to craft entire levels where Blazkowicz is armed with nothing but a knife. These are interesting because they add variety to the game's pacing, providing quiet, tense moments in which you are required to pay attention to enemy patrols and lines of sight, but which don't end in a "game over" screen if you get spotted. Nazi commanders, who can call in reinforcements if they detect you, create a hierarchy of high-value targets in a single room. When those commanders are present, the interface shows your distance to them, but not their exact location. It's rewarding to feel like you're stealthily stalking them, taking them out silently, and then are free to pull out the big guns to clear an area in the most efficient manner possible. With these mechanics, along with some interesting mission locations and stellar environmental design, The New Order offers a wide variety of combat experiences.</p>

16	Clever puzzles, fun platforming	variety, clever, pace, challenge	Life Goes On's early puzzles ease you in, maybe tasking you with jumping into a spinning saw blade before lifelessly falling onto a pressure plate that provides safe passage for your next knight. Things get clever quickly though, and you're soon stacking corpses like cordwood to coordinate and manage a variety of elements and factors that keep each level's Holy Grail-like prize out of reach. In addition to the aforementioned obstacles and traps, the little human sacrifices encounter swinging pendulums, seesaws, ramps, conveyor belts, lava lakes, and little monsters that fall into a deep slumber upon popping knights in their maws like peanuts. In addition, morbid fun is delivered via cannons that must be carefully aimed before firing their flesh-and-bone bullets into a grisly death trap.
17	Engaging puzzles and imaginative scenarios *	variety, challenge,	These puzzles cleverly find many different ways to combine simple elements like tossing objects to distract enemies, pulling levers to activate machinery, and issuing commands to your devoted canine companion, Walt, and they're just challenging enough to be engaging and satisfying, without being so difficult as to interfere with the story's momentum. And throughout the stages, you can find collectibles that shed light on the historical realities of the war, illuminating the miserable conditions soldiers engaging in trench warfare had to live with, for instance, or the ways that the war affected the rights and workplace responsibilities of women.
20	Inventive level design and tight mechanics combine to create an intelligent stealth game	variety, challenge, innovation	New enemy types with different vision cones and various patrol patterns made me adapt on the fly, and force fields erased routes I once thought passable. These pickups aren't just hints at how to navigate the level, but useful tools that change the way you observe the environment.

21	Fantastic boss battles reward your concentration and planning	variety, challenge,	<p>The mostly peaceful exploration contrasts the high-stress, intense battles with the game's bosses. These fights can be difficult, though they rarely feel unfair--and you can always leave and go somewhere else if you're having too much trouble dealing with one. Success requires concentration and carefully-timed attacks. Forge ahead with too much zeal and an enemy can easily catch you off guard, killing you in one swift motion. The boss battles themselves can be as simple as "shoot a bunch of harpoons into them at the right time," but a couple have more varied solutions--some even have hidden exploits that can help turn the tables in your favor. Triumphant over the game's challenging bosses grants a feeling of immense satisfaction--your reward for patient, measured play.</p>
22	Impressive range of character classes and skill development	variety, feedback, flexibility	<p>Grim Dawn's combat is every bit as compelling as the story and setting, even though those two elements are arguably more original than the very good, if very traditional, action RPG mechanics. Character creation and evolution are suitably deep. There are six classes to choose from when creating your hero, and the range of options--Arcanist, Demolitionist, Nightblade, Occultist, Shaman, and Soldier--cover all the D&D-inspired bases. You can even dual-class a little way into the game if you're not entirely happy with your initial choice or want to add different skills to the mix.</p>
23	Dense environments that give you plenty to do	Variety, efficiency, flexibility,	<p>You don't have to deal with the big things immediately if you don't want to, though. Like before, there are plenty of supplementary quests for those looking for a break from the core game. The tower-defense minigame makes a return, with robust tools for managing waves and waves of baddies. You can also hire soldiers, upgrade their equipment, and build up a small army to run consistent raids for you. They can bring back valuable items and tons of extra cash, which you can reinvest in your war effort, or yourself. Various non-player characters also offer additional one-off quests that help further build out this surprisingly rich world, and yield some great loot for you and your companions. Finally, you also have some shops and crafting tools to help you get the best gear and tools for combat versus the weird, surreal, and undead monsters that roam the wilds outside of Borgova.</p>

24	Tense action and exploration	variety, challenge	There are many crowd-control options, from shotguns to a variety of grenade types, as well as long-range weapons such as sniper rifles, which add a bit of stealth to the mix. Though the game is more of an action adventure game than survival horror, it is not without tense moments and jump scares.
27	Lacks the gameplay variety of the original	variety	Unlike the original game, which offered multiple game genres (real-time strategy, shooter, tower defense) creatively compressed into thirty-second chunks, The Second Coming is entirely based around the RPG-styled gameplay. The lack of clever gameplay variety compared to its predecessor is one of the biggest disappointments of The Second Coming, and I often found myself wishing I could switch to a different sort of 30-second adventure every so often like I could with the original.
32	Clever level design makes constantly tweaking core orbital physics fun	variety	The variety of celestial objects in the game is a perfect fit for its tight three-hour running time. Gas giants allow you to bounce like a pinball machine. Fire planets propel you high in the sky off their steam. Water planets allow you to dive beneath their surfaces to collect stars and flowers. And gem planets are super-dense with stronger gravity wells than normal. Over the course of the seven constellations--with around 80 or so small levels in total--that make up the game's campaign, you also gain the ability to terraform the planets from one type to another, which is necessary for solving many of the game's simple puzzles.
33	Numerous options for destructive experimentation	variety	What follows is a collision of spectacle and scale. Helicopters dot the sky. Explosions chain across the screen. Combining a parachute and grenade launcher transforms Rodriguez into a floating artillery battery from above. In a world teetering toward total destruction, Just Cause 3 grants you the tools to push it over the edge. The traditional grenades, remote mines, and numerous land, air, and sea vehicles are all on call in the rebel arsenal. Then there's the tether: this grappling hook modification attaches two separate objects, and flings them toward each other, often with hilarious results. Rodriguez can reel enemies toward explosive barrels, collapse watchtowers, and pull attack helicopters into a fiery end. It's a testament to this game's creativity that guns were my last resort.

36	Shuffling of upgrades and enemies after death keeps playthroughs fresh	variety	In less capable hands, such challenges might be overcome by simply memorizing where Oblitus' monsters enter and exit, and recalling precisely when to make various jumps. But this is Oblitus, a name that means "forgotten." Ullmann's game escapes such predictability through the roguelike elements of its gameplay, which shakes up the locations and types of upgrades, health renewal boosts, and even a few of the enemies after each death to ensure that each playthrough differs from another. Even the map itself isn't entirely safe, as elements such as corridors and platforms sometimes subtly extend to make room for more foes. The upshot is that each of Parvus' forays into his strange world is fraught with an exciting urgency that's absent in 2D games relying on extra lives and self-sacrifice for the sake of experimentation. When you risk losing everything, Oblitus says, everything starts to count.
36	Compact world design keeps constant replays bearable	variety	That's a lot of abuse to hurl at players, particularly when it also means that some playthroughs will inevitably be easier than others. However, Oblitus keeps it manageable with zones that feel just large enough to deliver a satisfying sense of exploration while remaining compact enough to keep replays worthwhile. (There's even an achievement for beating the game within 25 minutes.)

38	Fantastic boss battles	variety, challenge, fantasy, flexibility	<p>The best is still the first: A nature giant that feels like Ursula from <i>The Little Mermaid</i> made entirely out of living trees and vines. Still, each of the bosses are just wonderfully realized, and you get maybe a good minute to marvel at them before the pain starts. A terrifying shield-swinging giant can summon a legion of dwarves out of the ground to rush at Thora with a scream. Halfway through the frost giant's fight, the playing field turns into a sheet of slippery ice; when it's down to a quarter bar of life, a white-out blizzard starts. A blacksmith giant has you fighting in a never-ending firestorm. What the Jotun typically lack in speed, they make up for in power, where being in the wrong place at the wrong time during a fight will mean your end in two hits. The Jotuns' patterns and weak points aren't hard to suss out whatsoever, it's simply a matter of using your limited arsenal to deal with them, and often with the horde of peripheral obstacles/enemies each Jotun will throw at you during, and quite often it will still not be enough. The game gives Thora infinite tries, and will start her right at the boss with each of her powers replenished each time she dies. Persistence and learning from the numerous failures will lead to success, but the game will not coddle, and every victory will be well-earned beyond a shadow of a doubt.</p>
40	Limited weapon set	variety	<p>The Stone Age setting can also be a detriment, though. The simple toolset serves the game's themes well, but with enough time, it becomes clear how limited your loadout really is. In stealth scenarios, I rely on my silent bow. In open combat, I swing my club wildly. When hunting elk and grizzly bears, I use my spears. There are several more creative tools, but by and large, I find myself relying on the same simplistic options time after time. Primal's reliance on Stone Age combat detracts from the emergent scenarios that occur elsewhere</p>

A complete memo-writing record is not presented here due to space limitations but available upon request.

Appendix 4_ Theoretical sampling

Game world

Wednesday, August 31, 2016 1:02 PM

- | | |
|--|--|
| <p>1. No two creatures are alike, and figuring out how they act and react to your presence forms the basis of these unsettling confrontations. I found most of these interactions to be rather tedious affairs,</p> | Encounters |
| <p>2. In addition to the mentioned obstacles and traps, the little human sacrifices encounter swinging pendulums, seesaws, ramps, conveyor belts, lava lakes, and little monsters that fall into a deep slumber upon popping knights in their maws like peanuts. In addition, morbid fun is delivered via cannons that must be carefully aimed before firing their flesh-and-bone bullets into a grisly death trap.</p> | Variety |
| <p>3. New enemy types with different vision cones</p> | Variety encounter |
| <p>4. Combat speed, a variety of enemies, and alternating types of rooms keep you off-kilter just enough so that the game never gets repetitive. One moment, you're taking on blackened babies in a huge cavern, and the next, you're dealing with poisonous slugs in a cramped room loaded with obstacles.</p> | Variety encounter and rooms pace -> unknown |
| <p>5. The basement and cave levels below the house are disturbingly filled with big piles of swirly cartoon poop (that comes in all shapes, sizes, and colors) and poop-related monsters like anthropomorphic piles of crap that fling smaller piles of crap at you and all sorts of related creepy crawlies like flies, spiders, slugs, and so forth, along with demon spawn like animated dead babies (that frequently explode when killed, spraying bloody viscera all over the place).</p> | Variety encounter and rooms |
| <p>6. the combat is always satisfying, due to the crunchiness of landing blows, the howls of human foes scorched by your Igni sign, and the fearsome behavior of necrophages, wandering ghosts, and beasts of the indescribable sort. It's easy to get sidetracked and outlevel story quests, but even lesser beasts require a bit of finesse; drowners attack in numbers, for instance, knocking you about and making it difficult to swing, while winged beasts swoop in for a smackdown and require you to blast them down with a flash of fire, a shockwave, or a crossbow bolt.</p> | Variety encounter |
| <p>7. The variety of options available in any given firefight is staggering. In fact, these encounters often feel more like puzzles. At one point, Rise of the Tomb Raider stages a battle on a frozen pond. Eight guards with heavy armor present a serious challenge, but by using the water, several holes in the ice, and the weapons at my disposal, I could even the odds. It was such an engaging encounter, I reloaded my checkpoint just to play it again. This game is filled with chances to experiment.</p> | Leven design -> variety options to complete challenge
Hard challenge can be resolved skillful, the player feel they are intelligent . |
| <p>8. A terrifying shield-swinging giant can summon a legion of dwarves out of the ground to rush at Thora with a scream. Halfway through the frost giant's fight, the playing field turns into a sheet of slippery ice; when it's down to a quarter bar of life, a white-out blizzard starts. A blacksmith giant has you fighting in a never-ending firestorm. What the Jotun typically lack in speed, they make up for in power, where being in the wrong place at the wrong time during a fight will mean your end in two hits. The Jotuns' patterns and weak points aren't hard to suss out whatsoever, it's simply a matter of using your limited arsenal to deal with them, and often with the horde of peripheral obstacles/enemies each Jotun will throw at you during, and quite often it will still not be enough.</p> | Variety boss fight -> variety challenge |
| <p>9. These changes might not have worked had Dark Souls II not made discovery such a thrill, but with each new area comes a new wondrous vista and a new challenge to overcome.</p> | Variety encounter and environments -> variety challenge |
| <p>10. In less capable hands, such challenges might be overcome by simply memorizing where Oblitus' monsters enter and exit, and recalling precisely when to make various jumps. But this is Oblitus, a name that means "forgotten." Ullmann's game escapes such predictability through the roguelike elements of its gameplay, which shakes up the locations and types of upgrades, health renewal boosts, and even a few of the enemies after each death to ensure that each playthrough differs from another.</p> | Randomly Variety level design increase difficulty and generate fresh play through experience |
| <p>11. The variety of celestial objects in the game is a perfect fit for its tight three-hour running time. Gas giants allow you to bounce like a pinball machine. Fire planets propel you high in the sky off their steam. Water planets allow you to dive beneath their surfaces to collect stars and flowers. And gem planets are super-dense with stronger gravity wells than normal.</p> | Variety level design -> variety challenge |
| <p>12. Things get clever quickly though, and you're soon stacking corpses like cordwood to coordinate and manage a variety of elements and factors that keep each level's Holy Grail-like prize out of reach.</p> | Variety level design |
| <p>13. and various patrol patterns made me adapt on the fly, and force fields erased routes I once thought passable.</p> | Variety level design |
| <p>14. No attempt on the tower is the same twice, and although many of the levels will appear familiar as you play, there are always new level chunks to discover or a new enemy layout in a familiar landscape to keep repetitiveness from setting in. Even if every run were on identical terrain, for better or worse, each run is further differentiated by the loot that spawns. Some attempts may give you access to weapon modifications or items that make your destructive path easier to achieve. Others may give you more jumps sooner. If you're extremely unlucky, you may just find coins and hearts everywhere, leaving your arsenal a meager sampling of the game's great sandbox.</p> | Variety level design -> unknown
Unknown increase variety |
| <p>15. there's far more more variety in terms of level design. Halls and rooms have more interesting angles, extra windows, more open areas, and multiple lanes for enemies to approach from: while better enemy placement creates increased diversity in the types of engagements you'll encounter. The melee-resistant dogs return, as do fat enemies which are impervious to anything other than bullets. But they're joined by bullet-ducking</p> | Variety level design |

- samurai, running enemies who leap to close the distance, and a selection of level-specific mini-bosse
16. With more diverse levels populated with better placed and more varied foes, Hotline Miami 2 becomes a far more entertaining and challenging experience than its predecessor.
 - Variety level design -> variety challenge
 17. and a few puzzle elements are recycled more than you'd want,
 - variety level design
 18. Crypt of the NecroDancer is a turn-based adventure that tosses you into a series of randomly generated floors, usually with no more than a basic weapon with which to defend yourself.
 - Variety level design randomly
 19. Each floor has a number of secret hiding spots where you can discover new items or loot, and you find out at the end of each level what percent of those secret spots you found. Some are extremely well hidden, and I rarely managed to maintain above a 50% discovery rate for the secrets.
 - Meaningful hidden -> challenge goal
 20. There's now an actual overworld to explore between quests, offering optional dungeons, enemy battles, and tons of hidden secrets. Taking a bit of time to poke around between 30-second do-or-die adventures can yield treasures like hidden gear and evil lord medals, which can be exchanged for various unlockable features.
 - Meaningful Variety hidden -> challenge goal
 21. Lastly, consider how enjoyable it is to navigate Hyper Light Drifter's spaces--the networks of elevators and shimmering force-fields that lead to more discoveries, more hidden regions, and more locked doors begging to be opened. I vanquished the final boss after six or seven hours, but I'm still exploring, hoping to find every last crevice, every opening I've missed, every invisible platform. There are untold stories lurking out there.
 - Meaningful Variety hidden -> challenge goal
 22. If you can manage to pull yourself away from the action during a level, going against your instincts, you can peek around some corners and discover odd environments. In these places, unlikely objects float in mid-air and isolated landmarks beckon your attention. These areas are difficult to find, and often difficult to navigate, with quirky platforming sections and unusual arrangements that toy with your expectations. It seems that if you manage to find each of these areas, referred to as "secrets," you may be able to piece together greater truths about the story and your involvement in it. I was only able to scratch the surface.
 - Meaningful hidden->story goal
 23. Hotline Miami 2 is a challenging, often difficult, game, but playing through it's varied levels is so enjoyable that dying rarely feels like punishment. The game's grading system gives you an excuse to return to levels, but its neon-hot style is an even more inviting reason to play again and again.
 - Variety level -> difficulty challenge
 24. Despite the fact that there is no single correct way to beat a given level, your methods tend to stay the same unless you're self-imposing style challenges.
 - Variety level -> way to win Too many levels rely on rote behavior
 25. The parachute closed at random, cars disappeared while moving, and AI behavior made several story objectives impossible for a short time. One mission required me to steal a prototype combat tank from Di Ravello's forces, and extract it by boat to the hidden rebel base. However, the boat was too far from the dock for me to board it, and I had to reload the previous checkpoint. It repeated the same mistake twice more after that.
 - Intelligent encounter

Goals

Wednesday, August 31, 2016 3:28 PM

- | | |
|---|---|
| <p>1. Between gear diagrams and potion ingredients, I became a digital hoarder, a trap I typically avoid in role-playing games. Again, it comes down to balance: your inventory fills rapidly, but for the most part, this is not just "stuff" for the sake of "stuff." I knew that the ingredients I collected would allow me to create a potion that in turn let me dive for treasure without being annoyed by pesky sea-dwelling drowners. I knew that I could break down those horse hides I collected into armor components the local smith needed to make me look even mightier.</p> | <p>Meaningful goal</p> |
| <p>2. Learning the skills and vocabulary of the game gives you the confidence to risk chaining large combos, and it's at this level where you can experience Downwell's most exhilarating moments again and again.</p> | <p>Meaningful learning</p> |
| <p>3. Some rudimentary yet functional stealth mechanics allow The New Order to craft entire levels where Blazkowicz is armed with nothing but a knife. These are interesting because they add variety to the game's pacing, providing quiet, tense moments in which you are required to pay attention to enemy patrols and lines of sight, but which don't end in a "game over" screen if you get spotted.</p> | <p>Variety challenge type -> variety pace</p> |
| <p>4. It's rewarding to feel like you're stealthily stalking them, taking them out silently, and then are free to pull out the big guns to clear an area in the most efficient manner possible.</p> | <p>Rewarding</p> |
| <p>5. The game gives Thora infinite tries, and will start her right at the boss with each of her powers replenished each time she dies. Persistence and learning from the numerous failures will lead to success, but the game will not coddle, and every victory will be well-earned beyond a shadow of a doubt.</p> | <p>Learning and rewarding</p> |
| <p>6. You discover a boat and embark on an impromptu voyage through the islands of Skellige, taking note of the ship wreckage that mars the beaches and cliffs. The peacefulness is always broken, however—perhaps by a journey into a dark dungeon where your torch lights the pockmarked walls and a snarling fiend waits to devour you, or by the shout of a boy crying out for your assistance.</p> | <p>Emergent goal and challenge</p> |
| <p>7. Dark Souls II wants to kill you, but the cycle of death and rebirth is worth it if it means finding the royal ring that lets you open that giant door and discover what new and wonderful lands lie beyond it.</p> | <p>Rewardings</p> |
| <p>8. The focus remains on Clem, largely due to a tremendous number of twitch action sequences where you have to dodge and kill zombies with button mashing. Zombies attack constantly, which is a refreshing change from prior episodes, where long stretches would go by without your having to do so much as respond to a question or shove a dresser in front of a door. In this episode, the whole gang is menaced, from the frenetic opening escape from Carver through to the zombie wave assault waged on the Civil War site gift shop just as Rebecca goes into labor.</p> | <p>Difficulty pace</p> |
| <p>9. These fights can be difficult, though they rarely feel unfair—and you can always leave and go somewhere else if you're having too much trouble dealing with one.</p> | <p>Difficulty fair</p> |
| <p>10. You don't have to deal with the big things immediately if you don't want to, though. Like before, there are plenty of supplementary quests for those looking for a break from the core game. The tower-defense minigame makes a return, with robust tools for managing waves and waves of baddies. You can also hire soldiers, upgrade their equipment, and build up a small army to run consistent raids for you. They can bring back valuable items and tons of extra cash, which you can reinvest in your war effort, or yourself. Various non-player characters also offer additional one-off quests that help further build out this surprisingly rich world, and yield some great loot for you and your companions. Finally, you also have some shops and crafting tools to help you get the best gear and tools for combat versus the weird, surreal, and undead monsters that roam the wilds outside of Borgova.</p> | <p>Variety challenge type and effective and multi-level goals</p> |
| <p>11. Even the map itself isn't entirely safe, as elements such as corridors and platforms sometimes subtly extend to make room for more foes. The upshot is that each of Parvus' forays into his strange world is fraught with an exciting urgency that's absent in 2D games relying on extra lives and self-sacrifice for the sake of experimentation. When you risk losing everything, Oblitus says, everything starts to count.</p> | <p>Emergent challenge</p> |
| <p>12. Unlike the original game, which offered multiple game genres (real-time strategy, shooter, tower defense) creatively compressed into thirty-second chunks, The Second Coming is entirely based around the RPG-styled gameplay. The lack of clever gameplay variety compared to its predecessor is one of the biggest disappointments of The Second Coming, and I often found myself wishing I could switch to a different sort of 30-second adventure every so often like I could with the original.</p> | <p>Variety challenge type</p> |
| <p>13. That's a lot of abuse to hurl at players, particularly when it also means that some playthroughs will inevitably be easier than others. However, Oblitus keeps it manageable with zones that feel just large enough to deliver a satisfying sense of exploration while remaining compact enough to keep replays worthwhile. (There's even an achievement for beating the game within 25 minutes.)</p> | <p>Variety goals difficulty randomly</p> |
| <p>14. In The Witcher 3, discovering a diagram of new and improved chest armor is a cause for celebration. Geralt can get a shave and a haircut (and delightfully, his beard grows back over time), but otherwise, you cannot customize his physical appearance; new armor means a new look, and with it, a new visual attitude.</p> | <p>Meaningful goal rewarding</p> |
| <p>15. Walt, and they're just challenging enough to be engaging and satisfying, without being so difficult as to interfere with the story's momentum</p> | <p>Appropriate difficulty balance between challenge and story</p> |
| <p>16. The scripted story missions progress the plot, but the actual gameplay involved is repetitive at best, and broken at worst.</p> | <p>-variety goal and challenge</p> |
| <p>17. A handful of levels are more frustrating than fun,</p> | <p>-Difficulty</p> |
| <p>18. The speed of the game is frustrating at first, and it's tempting to try and take it slow, descending one platform at a time, making sure all enemies are clear, and taking a short breather before moving on. It's also tempting to hold out for your favourite weapon module, one whose damage spread and ability to slow your descent matches your preferred playstyle. This works for the first few levels, but past the</p> | |

18. The speed of the game is frustrating at first, and it's tempting to try and take it slow, descending one platform at a time, making sure all enemies are clear, and taking a short breather before moving on. It's also tempting to hold out for your favourite weapon module, one whose damage spread and ability to slow your descent matches your preferred playstyle. This works for the first few levels, but past the game's first world, this calculated approach only causes even more frustration. Terrain traps are introduced, which cause damage if your character lingers too long, a time-based mechanic forces a race to the end of the level, and solid platforms to rest on become increasingly scarce. But once you start to become familiar with the game's array of obstacles and learn how to better react to situations, playing Downwell at a quicker pace becomes incredibly enjoyable.
19. I sought every nook and cranny, gathering lockpicks and performing a simple but enjoyable minigame to access locked areas or neuter pesky turrets
20. The pace is methodical but not slothful, and while the sneaking isn't a crushing challenge, it requires some forethought.
21. It is more than simply pretty; Hyper Light Drifter uses its visuals to both guide and relax you. The grandest vistas calm your pulse between difficult, breathless combat sequences. Developer Heart Machine applies to its visuals a lesson music composers learn early in their studies: rests are as important as notes. Heart Machine uses the number of notes required, no fewer and no more; during the rests, you explore the world, looking for secrets and valuable health packs. You take in sights such as a colossal mechanical hand—iced over, disembodied—and wonder about the titan it belonged to.
22. You do all this in the space of a second or two, calculating the right trajectories and timings on the fly, and hoping you get the math right—or at least, close enough to stay alive. It's not like there are health packs raining from heaven, and you can only hold so many. These battles are fluid, demanding, and—usually—fair.
23. fighting enemies to gain levels, stopping at towns to get information and supplies, and finding a path to the boss's lair. Given that there's only 30 seconds to accomplish all of this, things have been heavily streamlined: enemy fights involve auto-ramming into foes until somebody dies, character levels skyrocket within seconds, and towns are linear paths that allow you to dash in, get what you need, and dash out. Even so, 30 seconds is a harsh time limit, so you have the ability to pray to statues of the time goddess to reset the clock. But every time you do, she asks for a little bit more cash, making each progressive reset more and more expensive to finance. The game transforms a typically slow-paced genre into an epic race against time, turning genre conventions on their head and making you think and act quickly in order to succeed.
24. it's a brief yet satisfying ride through a fast-paced action game, and dozens of unlockable rewards continually entice you back into the fray.
25. Great rhythm and balance between speedy combat, loot drops, and plot points
26. Spectacularly speedy gameplay
27. Grow Home does not provide you a screen filled with side objectives and a constant stream of narrative reinforcement: It is happy to let you take your time, to meander, to move at your own pace for the few hours it takes to finish it.
28. You have to keep moving with the music, so you have no time to think about what you did wrong or how to recover from it. You move the wrong way, taking another hit—your last. You kick yourself for losing all that gold and all those items, but you restart the game, hoping to do better next time. The catch is that you have to do all this in time with the floor's music—and if the song ends, you move deeper into the floor whether you're ready or not.
29. There's a lot of death in Valiant Hearts, but very little direct violence. You do occasionally have to clobber an unsuspecting enemy soldier from behind, and you may blast a few planes out of the sky in one sequence, but most of your time is spent helping people rather than attacking them. You provide first aid to the wounded, rescue people trapped in buildings, and give a soldier a nice, clean pair of socks. In this game, you are not a killing machine. The war itself is. There's an appropriate feeling of futility that comes from charging into battle again and again and seeing soldiers on both sides fall in droves to artillery blasts and machine-gun fire. Things become increasingly grim as the game and the war progress, and a late-game stage set during the hopeless Nivelles Offensive is particularly hellish.
30. Life Goes On, however, pushes the concept of "taking one for the team" to new levels, not just encouraging you to accept collateral damage, but requiring you to cause these casualties to complete its challenges.
31. Superhot bears the look of your typical first-person shooter, but while your goal in each level is to kill every enemy therein, the time-based trickery involved makes it more like a puzzle game than an FPS. Planning and execution are valued over reflexes and sharp-shooting skills.
32. It added a bit of tension as well, knowing that if my machines started to fall, I'd need to rapidly get them back into action or face death. The extra skill slots made managing the chaos of battle more challenging but also more rewarding without teetering into the unnecessarily convoluted.
33. Downwell's biggest incentive to keep playing fast and risky is the game's combo system: Every enemy the player kills before touching the ground counts towards a combo multiplier, which can eventually reward you with increased ammo capacity, and large amounts of currency to spend at sporadically-placed upgrade stores. Because your character has a limited number of shots in the air before running out of ammo, and jumping on enemies refreshes that ammo, maintaining a long combo becomes a challenging feat of perception, quick decision making, and adept execution.
34. This was never frustrating for me, but I can see how it might be for others. Maybe you misjudge the amount of momentum BUD will have as he lands on one of the "branches" of the massive stalk, and wind up flinging him thousands of feet down to his demise. Or you might think you've got a firm grip on the cliff face, only to find that you've actually grabbed onto a loose boulder. Whoops. You can supplement your control of BUD with some environmental tools: enemy plants give you a way to boost BUD's jumping

Learning and rewarding pace

Variety challenge and goal

Challenge -> pace

Variety meaningful challenge and variety pace provide contrast. Difficulty curve

Quick Pace and fair difficulty rewarding Fluid effective

Fast pace and creative challenge type

Fast pace and rewarding -> meaningful and replayability
Pace variety goal perfect balance variety goal
Fast pace

Pace and personality goal

Challenge type -> pace
Fast pace

Effective goal

Creative way to complete challenge

Creative challenge type

Difficulty and rewarding

Difficulty learning and rewarding

Difficulty and punishment
Systems fault not player

control of BUD with some environmental tools: springy plants give you a way to boost BUD's jumping power, while flowers and leaves work as parachutes and hang gliders. But these often lead to other stumbles. Pro tip: if you crash into anything while floating around with that leaf, you lose hold of it and go into a headfirst dive. Whoops, again.	
35. These unlocks give a good sense of permanent progression as you play, though you can buy all the items relatively quickly. I purchased all of them long before I was finished playing through the game, making diamonds feel somewhat useless on later runs.	Meaningful goal efficient
36. Every action you take drains it, and drains it quickly, so keeping the lights on or the doors closed for half of your shift means the power to the whole place gets killed about 20 seconds before you do, in one of the most sudden and terrifying jump scares ever executed in any medium.	punishment
37. And just when it seems the well of experiments might be running dry, Avalanche Studios adds variety to proceedings. As you liberate new provinces from enemy hands, challenges pop up across the map, including vehicle races, machine gun score contests, and wingsuit dives. They're fun on their own, but they're also well worth pursuing. By completing these, you'll unlock new gear mods, which change the functions of certain items.	Variety and meaningful goal challenge
38. On one of Primal's nights, the valley's lurking threats coalesced into a challenge that tested all of my knowledge of the game's survival systems. I was out of wood for spears. I was low on meat for health. I was hundreds of meters from the warmth of the nearest campfire. So by sprinting toward the closest sanctuary on my map—collecting hardwood for torches along the way, and relying on stealth and my few remaining arrows for defense—I trekked through one of the more stressful scenarios the game had to offer. Yet it was thrilling. This was Primal at its best.	Challenge interact with story setting immersion
39. Though it will take a number of failures to understand the ecosystem, learning which items are universally useful and avoiding long-term hoarding are the key to staying alive. For example, keeping uncommon fire-starting materials in order to have a method of staying warm, dry, and being able to build a safe place to sleep is more vital than hoarding food—food eventually spoils, and edible flora is common enough in certain ecosystems to snack on as you come across it. Working out your priorities and having the courage to leave valuable things behind is a stimulating challenge. The Flame in the Flood keeps you on your back foot at all times. This feels like true survival.	Grounded effective challenge feel like real learning
40. This cascading structure is what makes Just Cause 3 so great. There's a cadence to how you approach its world: outpost liberation leads to challenges, which leads to gear mods, which leads to experimentation. And more often than not, each tier of this formula is entertaining in itself. That each flows so well into the next makes the overall experience all the more rewarding. Just Cause 3 excels because it adds variety to the equation throughout, making destruction and mayhem entertaining far past the early hours.	Meaningful challenge and goal
41. The Escapists is challenging and tense, but also engaging and deeply enjoyable. It will take you hours to figure out how to escape your first prison, but if you're tough enough and clever enough to breach the walls, the feeling of triumph accompanying your newfound freedom will completely wash away all the blood, sweat, and tears that paved the way.	Effective challenge difficulty rewarding goal
42. Hope can pick up pepper spray, tasers, and a landmine that puts the Prizrak to sleep. She can even pickpocket them from the Prizrak if she's clever. But for every item Hope picks up to just barely fend off being caught, the Prizrak get taser-proof armor and nerve gas. It's in character for the game at least since Hope is definitely shown to be a naïve character who wouldn't know anything about the subtle arts of murder and persuasion. But it means often feeling like Hope is hideously outnumbered and outgunned.	Meaningful challenge
43. Heists remain the highlight, and the whole process of planning them out, hiring members of the team, gathering equipment, and then hoping that the fuzz doesn't interfere on the big day is utterly engrossing. Bombs are exploded, helicopters are smashed into the side of skyscrapers, and entire squads of police give chase as you make a futile attempt escape down the highway; the sheer thrill of a four or five star chase as what seems like the entire state's quota of law enforcement descends upon you cannot be understated.	Effective challenge 代入感
44. A handful of levels are too short and simple, the game is short. It took me just over three hours to do a 100-percent run for each star and ghost and power-up. And, once you've beaten it, there are few incentives to go back and play again, minus chasing a couple of achievements you wouldn't think to chase on your first go around.	Difficulty-replayability
45. Grim Dawn is a fast-paced, gory, and loot-filled action RPG that deserves a spot among the greats of the genre. The developers at Crate Entertainment have ticked off all the boxes that hack-and-slash fans want, and as one of those fans, I was reminded of countless experiences from the past, but there's more to Grim Dawn than old tricks.	Effective goal challenge activity
46. Actually, Rebirth is easy to categorize on the surface. The game is a basic roguelike, with tips of the hat to the frenzied combat in Robotron. The feel is decidedly old-school in that the top-down maps are randomly generated and you have to plow through the entire game in one sitting (so don't die, or you're going right back to the beginning). If you've ever played a classic arcade game, you know the drill. You run around constantly, shoot everything that moves, and grab power-ups. Repeat through each level until you kill the end boss or die and start all over again a little bit older and little bit wiser.	Effective goal challenge activity
47. Extremely short length	Efficient
48. Expansive solo campaign. As expected with a hack-and-slasher like this, you level up frequently--expect to hit level 10 within a couple hours, for example, and to be well into the high double digits long before wrapping the campaign.	Efficient effective
49. That said, if you know what you're signing up for, you will appreciate the opportunity to prolong the pain in a variety of unlockable minigames and modified challenges, some of which are capable of crushing the soul of even the most hardened player.	Variety challenge type meaningful replayability
50. and empowering you with a wonderfully flexible combat system that fuses real-time and turn-based action to create something that feels unique.	Creative challenge type

- soul of even the most hardened player.
50. and empowering you with a wonderfully flexible combat system that fuses real-time and turn-based action to create something that feels unique.
51. With this fresh and interesting setting, powerful and satisfying weapons, and a new, robotics-focused take on the Nazi war machine, developer MachineGames, formed by ex-Starbreeze veterans, has figured out how to answer these questions.
52. The Escapists is a gratifying game that provides dozens of hours of entertainment. Planning an escape and watching it unfold is endlessly satisfying, and a successful breakout leaves you feeling jubilant. Even after you master the game's six prisons, there are three extras waiting to be challenged.
53. Lacks in tension due to the inability to fail
54. It's only because Hyper Light Drifter is so masterful that its rare blips stand out at all. Consider the boss battles, which require a measure of skill, particularly if you only have one or two health packs on hand. Avoiding trouble doesn't just mean drifting away, but drifting into a position that makes your next drift or next attack successful.
55. I must give credit to Dark Souls II for making combat feel as fair as it does. The Souls games have always given you the tools to succeed, but while playing the newest entry, I was impressed by how it balanced new challenges with subtle ways to help you succeed. Sometimes, the path to success is relatively obvious, like using a lever to dunk baddies in boiling lava, or luring an armored turtle under a blade and watching the makeshift guillotine slice the half-shelled villain in two. Other possibilities are so subtle as to be obtuse, rewarding thorough investigation with an unexpected boon. Is poison complicating a battle against an evil queen? Is darkness inhibiting your ability to lock on to a pouncing behemoth? There might be some help out there, just hidden from view. Dark Souls II trusts you to find it—or if not, to overcome without it.
56. Mastering the basics takes a bit of time—and many, many lives—but once you lock them down, the in-the-zone moments come fast and furious. It quickly becomes super-satisfying to blaze through and buzz around levels, dodging enemies and gathering collectibles as you go.
57. The game never wants you to get too comfortable, of course, so new challenges, obstacles, enemies, and other life-siphoning elements are layered on as you progress through the 200-plus levels. You need to play with fire to break through ice, for example, and, conversely, make friends with the frozen stuff to defy death beams; portals can pinball you around stages; and end-level objectives, as well as enemies, will similarly warp about to keep you on your toes.
58. Boss encounters break up the more standard challenges (if you can even call them that), requiring you to call on varied strategies, from running like hell to inflicting damage with dash attacks.
59. The game's grading system gives you an excuse to return to levels, but its neon-hot style is an even more inviting reason to play again and again.
60. So what is there to say about the story? There's a lot more of it, for one. The first third of the game has you sitting through long periods of confusing exposition that do little to clarify exactly what's going on. But even when Hotline Miami's story eventually finds its pace, you're probably not going to be taken aback by the narrative. The original game intentionally obfuscated what was going on behind an unreliable narrator and secret endings, and much of that continues here. Callbacks to the first game, shifts in perspective, and furious timeline swapping make the story read better on a second playthrough.
61. Steady ramping up of difficulty
62. No easy way to track down that one, last collectible
63. Thora can find massive shrines to the Gods in each stage, and by praying there, she earns new magical powers specific to each one—Thor allows her to use Mjolnir for a short time, Frigg allows her to heal at will, Loki creates a decoy that eventually explodes after a time—but all six of the powers have limited uses, and none are what you would call a guaranteed solution to any sticky situation. Primarily, timing, cunning, and luck will get Thora to Valhalla.
64. The speed of the game is frustrating at first, and it's tempting to try and take it slow, descending one platform at a time, making sure all enemies are clear, and taking a short breather before moving on. It's also tempting to hold out for your favourite weapon module, one whose damage spread and ability to slow your descent matches your preferred playstyle. This works for the first few levels, but past the game's first world, this calculated approach only causes even more frustration.
65. Yet regardless of your initial skill level, Revengeance is an accessible action game that emphasizes entertainment without overshadowing the importance of depth and nuance.
66. Exploring Rapture is tense but not unforgiving. And thus Episode 2 rocks to a different rhythm than Infinite's previous adventures. The pace is methodical but not slothful, and while the sneaking isn't a crushing challenge, it requires some forethought. Occasionally, I would slink up to a splicer from behind and knock him out with a swift melee blow. Other times, I would take aim at a fiend from a balcony above and fire a tranquilizer dart into his neck. Every so often, I set icy traps using the winter blast plasmid, and then tricked splicers into crossing them by firing noisemakers in their general direction. And when I was cornered, a blast from a shotgun could cure my ills, though this was typically a last-resort option. I sought every nook and cranny, gathering lockpicks and performing a simple but enjoyable minigame to access locked areas or neuter pesky turrets. What a pleasure to explore Rapture not as a gun-toting maniac, but as a survivor seeking answers.
67. While Fenix Rage generally tested my skill more than my sanity, it isn't totally void of infuriating moments. On top of not being able to bypass especially patience-trying stages, its later-level challenges sometimes rely too heavily on chaos over creativity; these areas are simply too cluttered with things that want to kill you, as well as those that require near-constant air-catching because there's no solid—or safe—ground below. Expect Flappy-Bird-levels of frustration.
- replayability
- Creative challenge type
- Creative story setting encounter
- Meaningful variety challenge efficient
- Meaningful -> -tense
- Skillful challenge
- Learning, fair
- Learning fair
- Variety challenge encounter level
- Variety challenge -> variety way to complete challenge
- Goal -> challenge -> replayability
- Story -> replayability goal
- Learning
- Skillful difficulty
- Fair difficulty Tough but mostly fair challenge
- Skillful
- Learning first experience
- Depth and accessibility coexist in harmony learning
- Skillful Difficulty
- Too Difficulty without possibility

Avatar

Wednesday, August 31, 2016 12:54 PM

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| <p>1. These fights can be difficult, though they rarely feel unfair--and you can always leave and go somewhere else if you're having too much trouble dealing with one.</p> <p>2. In a world teetering toward total destruction, Just Cause 3 grants you the tools to push it over the edge. The traditional grenades, remote mines, and numerous land, air, and sea vehicles are all on call in the rebel arsenal. Then there's the tether: this grappling hook modification attaches two separate objects, and flings them toward each other, often with hilarious results. Rodriguez can reel enemies toward explosive barrels, collapse watchtowers, and pull attack helicopters into a fiery end. It's a testament to this game's creativity that guns were my last resort.</p> <p>3. The simple toolset serves the game's themes well, but with enough time, it becomes clear how limited your loadout really is. In stealth scenarios, I rely on my silent bow. In open combat, I swing my club wildly. When hunting elk and grizzly bears, I use my spears. There are several more creative tools, but by and large, I find myself relying on the same simplistic options time after time.</p> <p>4. Loot has a huge role to play in the game, thanks to the high degree of armor and weapon customization. Different armor sets in particular are a joy to uncover, making Geralt look more and more hardened as you progress.</p> <p>5. The Witcher 3 also benefits from its hugely expanded potions system, which allows you to quaff potions during combat--though as always, witcher potions are dangerous, and Geralt can only have so many in effect due to their rising toxicity. Between gear diagrams and potion ingredients, I became a digital hoarder, a trap I typically avoid in role-playing games. Again, it comes down to balance: your inventory fills rapidly, but for the most part, this is not just "stuff" for the sake of "stuff." I knew that the ingredients I collected would allow me to create a potion that in turn let me dive for treasure without being annoyed by pesky sea-dwelling drowners. I knew that I could break down those horse hides I collected into armor components the local smith needed to make me look even mightier.</p> <p>6. These pickups aren't just hints at how to navigate the level, but useful tools that change the way you observe the environment.</p> <p>7. There are many crowd-control options, from shotguns to a variety of grenade types, as well as long-range weapons such as sniper rifles, which add a bit of stealth to the mix.</p> <p>8. Unfortunately, that lack of depth is one of the few knocks against Apotheon. Repeating the block-wait-attack tactic for ten hours gets thin.</p> <p>9. Power-ups are equally loony-tunes. There are hundreds of these goodies in the game, some passive, some active, and all are surreal, blasphemous, or an inventively sick combination of the two. Isaac can pick up the Stigmata power-up and start shooting more powerful bloody tears. The Black Bean causes Isaac to spew toxic fart clouds whenever he is attacked. A Placenta boosts health. The severed heads of various pets provide all kinds of buffs, as do Tarot cards, evil books, and so forth. Cancer gives you -- ah, I don't even know or want to know. It was enough for me to see Isaac shout, "Yay, cancer!" when he picked it up.</p> <p>10. Actions have to speak louder than text boxes here, and there's a master's grasp on how to make interactivity mean something again here by giving control back to the player only for maximum impact, be it letting the silent young protagonist skip through puddles on the way home from school, breaking apart the bread so that the bird can eat, or the hard gut stab that comes from the game's final sequences, a long, literal flight of fancy to try to find the bird's family. The effects of our protagonist being a latchkey kid play itself out only in his reaction to the consistent, growing piles of reminder notes scattered around his apartment that need to be collected when he returns home, and it all seems pointless until the pile of notes turns into a hollow, desolate feeling near the climax.</p> <p>11. Your gun options are quite diverse; whether you want to fire bouncing sawblades, highly explosive "unicorn vomit," or the FPS-staple rocket launcher, Tower of Guns has you covered. When it comes to perks, you quickly realize there's no better option than your initial choice--the Bluegrass perk. Because who doesn't want to start with the ability to triple jump?</p> <p>12. As you progress through the levels, you gain access to additional jumps and faster movement while seeing a marked increase in difficulty.</p> <p>13. And there are so many other possibilities. You can knock out guards and use a putty mold to copy a key, shimmy down walls with a grappling hook, or even impersonate a guard. Whatever steps you choose to take feel personal and never scripted.</p> <p>14. At one moment, you're a journalist attempting to use non-lethal takedowns in a subway station; At the next, you're a soldier using a flamethrower to incinerate enemy forces in Hawaii. While you spend a lot of time running around buildings, there's far more more variety in terms of level design.</p> <p>15. There are a bunch of other characters you can unlock and play as, each with unique twists that force you to play in different ways (with one character, for example, you get free items from shops, but picking up money kills you).</p> <p>16. There are also powerful enemies whose excessive armor chips away at the fun. I had the best spear upgrades possible, but even at this point in the game's late hours, these armored brutes can take almost 30 seconds to bring down. That's not fun--that's tedium.</p> <p>17. The only drawback was that this influx of goods overwhelmed my inventory and forced me to make frequent trips to town.</p> <p>18. The real problem with that desolation is that more than a few times, you'll need to backtrack through some of these areas to find much needed power ups, or because you've missed a crucial switch in order to get to said power ups, or because you've ended up in an area and the game's obtuse pause screen map didn't help you.</p> <p>19. Unfortunately, this aspect becomes tedious after a short time. It devolves into a constant process of pressing the same button on identical trees and bushes and dead rabbits over and over again. Rise of the Tomb Raider's world is stunning, but I was too often distracted by the repetitive abundance of resources strewn about the otherwise beautiful canvas.</p> <p>20. The scripted story missions progress the plot, but the actual gameplay involved is repetitive at best, and broken at worst.</p> <p>21. But managing to hurtle through a large stretch of a level while dealing with everything that comes your way without even touching the ground is a joyous feeling, when you pull it off.</p> <p>22. With each drift, you leave a series of brief afterimages in your wake, which makes the mechanic inherently enjoyable.</p> | <p>User control and freedom</p> <p>Variety actions and freedom -> creativity</p> <p>-Variety but meaningful actions</p> <p>Effective meaningful action due to appearance</p> <p>Effective action variety</p> <p>Meaningful pickup</p> <p>Variety</p> <p>-variety</p> <p>Variety pickups</p> <p>Variety actions</p> <p>meaningful</p> <p>Variety freedom in control</p> <p>Variety characters</p> <p>Variety character</p> <p>Repetitive pace</p> <p>-Meaningful actions non-game related actions</p> <p>-Meaningful actions</p> <p>-Meaningful actions</p> <p>-variety Repetitive</p> <p>Effective action</p> <p>Effective action</p> | <p>Item contribute to the action</p> |
|--|--|--------------------------------------|

21. But managing to hurtle through a large stretch of a level while dealing with everything that comes your way without even touching the ground is a joyous feeling, when you pull it off.	Effective action
22. With each drift, you leave a series of brief afterimages in your wake, which makes the mechanic inherently enjoyable.	Effective action
23. A sunken submarine may inspire awe, but I found these sea walks to be dull, plodding affairs. Despite appearances, they're incredibly linear, shuffling you along from point A to point B with nothing all that interesting to see in between.	-meaningful action
24. These abilities are the embodiment of Primal's strengths. When it uses the Stone Age setting to elevate the combat and reinforce the brutality of nature, it thrives. It fosters a give-and-take relationship with the wilderness, granting you the means to survive, but also the threats you have to overcome.	Meaningful action interact with story setting
25. It is both a weapon and a utility that can manipulate the environment. However, its use is mostly relegated to cutting Blazkowicz-sized holes in the only pieces of metal grating that are blocking forward progress in the first place. There are a few panels which hide secret areas containing health and ammo pickups, but although you can cut any shape you like, unless it's a square you won't fit through it.	Effective action freedom in control
26. The controls and objectives are similarly straightforward. Fenix must navigate increasingly hazardous stages by jumping and dashing. Thankfully, he possesses the power to do both of these things infinitely, resulting in the game's defining hook and most differentiating factor. Where similar games have you mastering more traditional platforming moves, such as running and double-jumping, Fenix Rage first asks you to relearn what many years of Super Mario Bros. have taught you.	Creative and effective action
27. Maybe you misjudge the amount of momentum BUD will have as he lands on one of the "branches" of the massive stalk, and wind up flinging him thousands of feet down to his demise. Or you might think you've got a firm grip on the cliff face, only to find that you've actually grabbed onto a loose boulder.	Effective action in control
28. Those guns are big, loud, and satisfying to shoot. Most weapons can be dual-wielded, which works well because you don't lose any accuracy by not aiming down the sights, a tweak that lends the combat a sense of finesse despite its fast pace.	Action representation and feedback -> tweak combat sense
29. Combine that with the fact that the majority of the perks themselves have only subtle effects, such as slightly extra ammo, and you'd be forgiven for forgetting the system exists at all.	-meaningful perks
30. Outside of the perks system, weapon upgrades can be found throughout the game's levels and permanently attached to your guns. Assault rifles can be upgraded to fire underslung rockets, and shotguns can be made to fire shells that bounce off walls, effectively turning them into Unreal Tournament's flak cannon. The upgrades are useful, opening up new avenues for tactical approaches to taking down the tougher Nazi foes.	Meaningful upgrades
31. No matter how much I chose the good-guy path in dialogue selections (which seem to have increased both in number and in the starkness of the choices they offer in comparison to the previous episodes), bad things kept on happening. Encouraging Jane to change her ways and start helping other people only succeeded in delaying the inevitable. Meaning that the person I was trying to save died anyway, but with the added benefit of putting other lives in jeopardy, too. This was finally hammered home toward the end of the episode. After I convinced Jane to take a huge chance on trying to save a helpless friend, I was given a prime seat at the table alongside a zombie buffet.	Meaningful choice
32. In the interest of building Lara to fit your unique playstyle, Rise of the Tomb Raider incorporates three skill trees: hunting, brawling, and survival. Each contribute to their respective fields in disparate ways, by making certain aspects of the game less challenging or more rewarding. One allows Lara to shoot two arrows at a time, for instance. Another grants her more ammo when looting enemy corpses. The wide array of skills works well because each feels worthwhile. Pursuing them adds another layer in an already nuanced system. I opted for stealth when I could, waiting for a lone soldier to stray from the pack before finishing him, or sending arrows into snipers from a distance.	Variety and meaningful skill tree
33. Loot has a huge role to play in the game, thanks to the high degree of armor and weapon customization. Different armor sets in particular are a joy to uncover, making Geralt look more and more hardened as you progress.	Meaningful action due to appearance
34. Character creation and evolution are suitably deep. There are six classes to choose from when creating your hero, and the range of options--Arcanist, Demolitionist, Nightblade, Occultist, Shaman, and Soldier--cover all the D&D-inspired bases. You can even dual-class a little way into the game if you're not entirely happy with your initial choice or want to add different skills to the mix.	Variety characters and skills
35. The focus remains on Clem, largely due to a tremendous number of twitch action sequences where you have to dodge and kill zombies with button mashing.	Tense Action -> pace
36. These fights can be difficult, though they rarely feel unfair--and you can always leave and go somewhere else if you're having too much trouble dealing with one.	Freedom in control
37. These puzzles cleverly find many different ways to combine simple elements like tossing objects to distract enemies, pulling levers to activate machinery, and issuing commands to your devoted canine companion,	Variety action -> variety way to complete challenge
38. And there are so many other possibilities. You can knock out guards and use a putty mold to copy a key, shimmy down walls with a grappling hook, or even impersonate a guard. Whatever steps you choose to take feel personal and never scripted. It's a surprisingly deep and complex system that I didn't expect but quickly fell in love with. It's highly malleable and widely varied, allowing you to make every trip to the Big House a different experience, while staving off dull repetition.	Variety action freedom in control -> variety strategies
39. Alex's choices are split between being compassionate and supportive or sarcastic and angry, and her relationships with Jonas and Clarissa are the focal point of Oxenfree's narrative. How you make Alex treat her friends is the core mechanic of Oxenfree; comforting or ridiculing them along the way has serious implications. When Alex is rude, others are crappy towards her. When she fights with others, they indicate a loss of respect and trust. But when she shows compassion to a frightened friend or promises to help, her friends stick by her. She can be a selfish jerk or a selfless hero, and both ends of the spectrum add a dramatically different tone to the tale and different consequences later in the game. I felt that my behavior genuinely mattered.	Meaningful action
40. Destructible environments create a power fantasy	Effective action
41. As the alligator astronomer that stars in Lost Constellation, you move to and fro as you might in an old-fashioned platformer, but this is a PC adventure of the classic sort, gating narrative developments behind light puzzles and exploratory tableaux. Interactions are simple: you gather snowballs and throw them, build and customize charming snowmen, and speak with the delightful denizens of the worlds you travel through. The simplicity complements the	Action interact with story setting

- snowmen, and speak with the delightful denizens of the woods you travel through. The simplicity complements the story, stressing the graceful snippets of dialogue with object collection and chime-ringing. Lost Constellation is not so much about "what," however, than it is about "where" and who."
42. Raiden can capably whittle his way through most objects, from chain-link fences to armored plated tanks, but your happy-go-lucky slicing eventually collides with the cold reality that not everything is destructible. You can thank Revengeance's linear design for these boundaries, but the limitations are only a minor distraction from the enjoyment of decimating foe and prop alike.
43. And yes, Elizabeth is a survivor here, incapable of opening tears and observing the endless versions of power-hungry men and the lighthouses that lead to them. You discover the circumstances that led to her loss of omniscience as you follow the game's natural trail, and the episode does a creditable job of giving narrative context to its own mechanics. Elizabeth's vulnerability in combat is echoed in her emotional vulnerability; she is merely human now, reliant mainly on her wits and her intelligence, and at the mercy of the sociopaths she must manipulate.
44. There's a great rhythm to every scrap, and monsters give you a good run most of the time, but almost always bite the dust well before your hand grows numb from incessant clicking. With that said, the game does feel somewhat padded. Some maps are a little too crammed with enemies. There were times when I just wanted to get to the end of a quest, and the "why settle on a thousand foes when two thousand would be even better?" approach became too much to take. Still, I continually got sucked into marathon play sessions that ran for hours. I'd get into a game and eventually look up at the clock to realize that five hours had vanished. Alien abductees have had less trouble with missing time.
45. There's now an actual overworld to explore between quests, offering optional dungeons, enemy battles, and tons of hidden secrets. Taking a bit of time to poke around between 30-second do-or-die adventures can yield treasures like hidden gear and evil lord medals, which can be exchanged for various unlockable features.
46. For a game that places death front and center, it was often inconsistent with whether I should die. I'm happy Just Cause 3 is lenient with its falling damage--considering I'm in the sky more often than not--but I survived a 500-foot fall at one point, only to die from a shorter one soon thereafter. These mishaps would be easy to overlook if they didn't disrupt an otherwise fluid experience too often.

ALIGHT INTERACT WITH STORY SETTING

Effective action

Effective action interact with story

Pace repetitive efficient

Meaningful Variety hidden -> challenge goal

-Effective action

Game world

Wednesday, August 31, 2016 1:02 PM

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|---|--|
| 1. No two creatures are alike, and figuring out how they act and react to your presence forms the basis of these unsettling confrontations. I found most of these interactions to be rather tedious affairs, | Encounters |
| 2. In addition to the aforementioned obstacles and traps, the little human sacrifices encounter swinging pendulums, seesaws, ramps, conveyor belts, lava lakes, and little monsters that fall into a deep slumber upon popping knights in their maws like peanuts. In addition, morbid fun is delivered via cannons that must be carefully aimed before firing their flesh-and-bone bullets into a grisly death trap. | Variety |
| 3. New enemy types with different vision cones | Variety encounter |
| 4. Combat speed, a variety of enemies, and alternating types of rooms keep you off-kilter just enough so that the game never gets repetitive. One moment, you're taking on blackened babies in a huge cavern, and the next, you're dealing with poisonous slugs in a cramped room loaded with obstacles. | Variety encounter and rooms pace -> unknown |
| 5. The basement and cave levels below the house are disturbingly filled with big piles of swirly cartoon poop (that comes in all shapes, sizes, and colors) and poop-related monsters like anthropomorphic piles of crap that fling smaller piles of crap at you and all sorts of related creepy crawlies likes flies, spiders, slugs, and so forth, along with demon spawn like animated dead babies (that frequently explode when killed, spraying bloody viscera all over the place). | Variety encounter and rooms |
| 6. the combat is always satisfying, due to the crunchiness of landing blows, the howls of human foes scorched by your Igni sign, and the fearsome behavior of necrophages, wandering ghosts, and beasts of the indescribable sort. It's easy to get sidetracked and outlevel story quests, but even lesser beasts require a bit of finesse; drowners attack in numbers, for instance, knocking you about and making it difficult to swing, while winged beasts swoop in for a smackdown and require you to blast them down with a flash of fire, a shockwave, or a crossbow bolt. | Variety encounter |
| 7. The variety of options available in any given firefight is staggering. In fact, these encounters often feel more like puzzles. At one point, Rise of the Tomb Raider stages a battle on a frozen pond. Eight guards with heavy armor present a serious challenge, but by using the water, several holes in the ice, and the weapons at my disposal, I could even the odds. It was such an engaging encounter, I reloaded my checkpoint just to play it again. This game is filled with chances to experiment. | Leven design -> variety options to complete challenge
Hard challenge can be resolved skillful, the player feel they are intelligent . |
| 8. A terrifying shield-swinging giant can summon a legion of dwarves out of the ground to rush at Thora with a scream. Halfway through the frost giant's fight, the playing field turns into a sheet of slippery ice; when it's down to a quarter bar of life, a white-out blizzard starts. A blacksmith giant has you fighting in a neverending firestorm. What the Jotuns typically lack in speed, they make up for in power, where being in the wrong place at the wrong time during a fight will mean your end in two hits. The Jotuns' patterns and weak points aren't hard to suss out whatsoever, it's simply a matter of using your limited arsenal to deal with them, and often with the horde of peripheral obstacles/enemies each Jotun will throw at you during, and quite often it will still not be enough. | Variety boss fight -> variety challenge |
| 9. These changes might not have worked had Dark Souls II not made discovery such a thrill, but with each new area comes a new wondrous vista and a new challenge to overcome. | Variety encounter and environments -> variety challenge |
| 10. In less capable hands, such challenges might be overcome by simply memorizing where Oblitus' monsters enter and exit, and recalling precisely when to make various jumps. But this is Oblitus, a name that means "forgotten." Ullmann's game escapes such predictability through the roguelike elements of its gameplay, which shakes up the locations and types of upgrades, health renewal boosts, and even a few of the enemies after each death to ensure that each playthrough differs from another. | Randomly Variety level design increase difficulty and generate fresh play through experience |
| 11. The variety of celestial objects in the game is a perfect fit for its tight three-hour running time. Gas giants allow you to bounce like a pinball machine. Fire planets propel you high in the sky off their steam. Water planets allow you to dive beneath their surfaces to collect stars and flowers. And gem planets are super-dense with stronger gravity wells than normal. | Variety level design -> variety challenge |
| 12. Things get clever quickly though, and you're soon stacking corpses like cordwood to coordinate and manage a variety of elements and factors that keep each level's Holy Grail-like prize out of reach. | Variety level design |
| 13. and various patrol patterns made me adapt on the fly, and force fields erased routes I once thought passable. | Variety level design |
| 14. No attempt on the tower is the same twice, and although many of the levels will appear familiar as you play, there are always new level chunks to discover or a new enemy layout in a familiar landscape to keep repetitiveness from setting in. Even if every run were on identical terrain, for better or worse, each run is further differentiated by the loot that spawns. Some attempts may give you access to weapon modifications or items that make your destructive path easier to achieve. Others may give you more jumps sooner. If you're extremely unlucky, you may just find coins and hearts everywhere, leaving your arsenal a meager sampling of the game's great sandbox. | Variety level design -> unknown
Unknown increase variety |
| 15. there's far more more variety in terms of level design. Halls and rooms have more interesting angles, extra windows, more open areas, and multiple lanes for enemies to approach from: while better enemy placement creates increased diversity in the types of engagements you'll encounter. The melee-resistant dogs return, as do fat enemies which are impervious to anything other than bullets. But they're joined by bullet-ducking | Variety level design |