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Usability in video game editors

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Preface

This is a master thesis written in spring 2017. The aim of this thesis is to see how easy players with little to no experience can use different game editors, and how editors can be improved if the goal is to optimize the editor for these players. The thesis also goes in-depth about different editor user types.

Acknowledgement

Abstract

This thesis is a research carried out to uncover what difficulties user with little to no video game editor experience encounter when using a in-game editor, and the characteristics of users who find video game editors easy to use by using two different methods. Four different game in-game editors – Grand Theft Auto Five, LittleBigPlanet 3, Portal and Trials Fusion – were selected based on gaming platform, complexity and popularity. Through usability testing, questionnaires and interviews with the five participants, several usability issues within all four editors were uncovered – particulary the more complex editors. The participants found the Portal 2 and the Trials Fusion editor to be significantly easier to use than the LittleBigPlanet 3 and the Trials Fusion editor.

Four surveys related to the four games were distributed through different game related channels, and player data was analyzed to find out the which users found the editors easy to use. There were some differenced within each editor between which type of players who found the editor easy to use. However, when cross comparing the survey results, there were no strong indications that certain player types found the editor easier to use, as the results were individual to each survey.

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1 Introduction

User-generated content in games are increasing in popularity, especially through popular mainstream games like Minecraft (Mojang 2011), Portal (Valve 2011) and LittleBigPlanet (Media Molecule 2014). Similar to YouTube and Wikipedia, users contribute by creating and sharing content with other players. The shared content is created through game editors which is either released as an addition tool to a game, or released a stand-alone software program. Some games emphasize more on user-generated content than others, thus highlighting the importance of creating an editor which is usable to players who are not professional developers or programmers.

Implementing an editor into a game can be beneficial for game developers and stakeholders. Game developers can salvage time and reduce development cost by involving players as creators, and players can implement different game creations of their own liking. The game developers can decide to what extent the players are able to modify a game, and what type of content that can be created and shared. Games are also more likely to keep players interested if fresh content is released frequently. Game editors can give players an opportunity to express their artistic and creative side through game creations, and share it with other players through the game and through communities.

Reviewing earlier works reveals that no studies has been exploring the usability side of game editors, or how players interact with editors which has different complexity and user goals. In this thesis, we look at how players with no prior game editor experience interacts with different game editors, and discover what issues beginners experience when using these tools by cross-comparing different editors. We will also go more in-depth about player types, and if players who find the editors easy to use have any distinctive characteristics. The findings in this study can help game developers to learn more about the core users of game editors, and what elements game developers needs to consider if the goal is to create a beginner friendly editor.

1.1 Problem description

How game editors can be developed to suit beginners with little to no experience, and what usability issues to consider when developing an editor.

1.2 Research questions

Research question 1: How easy can players create and edit content in video games with in-game editors which require no programming and low technical skills?

Research question 2: What are the characteristics of those who find in-game editors easy to use?

Research question 3: How can in-game editors be improved to meet the needs of players who have little to no experience with in-game editors?

1.3 Document structure

The paper consists of an introduction, followed by literature review in Chapter 2. Chapter 3 describes the methods used, and more information about the four games used in this research. The results are presented and analyzed in chapter 4. Chapter 5 discuss the findings, limitations of the study and further research. Chapter 7 provides a summary of the findings in a conclusion.

1.4 Explanation of abbreviations and terminology

LBP 3 – LittleBigPlanet 3

GTA V – Grand Theft Auto V (five)

TF – Trials Fusion

UGC – User-generated content

Game engine – Software framework for video games

Casual gamer – Players who play less frequently and at a slower pace than other gamers.

Core gamer – Players who play regularily and has a wider interest of games.

Hardcore gamer – Players with lots of gaming experience, who play more frequently than casual and core gamers.

2 Background

2.1 What is a video game editor?

A video game editor is a type of tool developed for users to generate or modify content in a video game, either through an external or internal editor (see chapter 2.2). Internal game editors are often platform independent, which means they are released to different platforms such as PC, PlayStation and Xbox together with the game. User-generated content (UGC) in games can include level designs, game items, game missions, game characters, game rules or other relevant content which exists in a video game. Some games like *Minecraft* and *LittleBigPlanet* rely heavily on UGC, as these games are developed towards players which has an interest in creating and sharing content. Other games rely less on UGC, but have in-game editor tools or external tools as an addition so players can generate more content other than what's included in the original game, created by developers (Graft 2012, Lightbown 2015).

A game editor provides options to create a certain type of content, depending on the type of player goals and the editors target group. One type of content can include specific challenges for other players to overcome, for example through a racing course in a racing game. Other content types can be created as a generic game world with no game goals, like a user-created map in *Minecraft*. Some user-generated content is very simplified, like custom characterization in World of Warcraft where players can only make a slight change in the character appearance because of the user constraints. Some content created by players can also be sold for virtual or real money. Sony Online Entertainment (SOE 2004) have had success with content creation in their game *Everquest 2*, where players can see profit by creating and selling in-game items in exchange for real money. Some of the sales profit are shared with SOE through revenues (Graft 2012).

Editors can also allow players to change the existing game rules, and change the player goals in the game. Ross et al. (2012) are using the term user-generated game design, which is a principle where players can change and modify the game's rule set, which means the creator decides what the house rules will be for a game, similar to the house rules of a game of Poker.

2.2 Types of video game editors

Video game editors can be divided into three categories; sandbox, in-game editors and external editors;

2.2.1 Sandbox:

Sandbox games are games where the premise of the game is to just create content. The word "sandbox" describes a game as a metaphor to children playing in a sandbox, where children are free with endless creativity, and being able to create through basic materials (Breslin 2009). The tools used in sandbox games are an integrated part of the game, and a part of the core gameplay as opposed to in-game editors and external editors. The most popular sandbox game today is *Minecraft*, which has sold over 121 million copies as of February 2017 (Gilbert 2017). Sandbox games do not have specific goals or missions as opposed to progression-styled games, but have an open-world gameplay where players can roam freely without constraints, where the focus is on creating and building content, and not create levels and courses which contain obstacles or any sort of challenges. These games do usually not have any form of competitive gameplay. Some mainstream sandbox games include *Minecraft* (Mojang 2011), *Garry's Mod* (Valve 2007), *The Sims* (EA 2003) and *Rust* (Facepunch Studios 2013).

2.2.2 In-game editors:

Games with in-game editors are usually included as an addition to the original game, based on the game's framework. Some editors have been released after the original game release if the editor is more complex, like the editor in *Portal 2*. Most in-game editor tools are simplified tools targeted towards beginners and casual players, compared to external editors which usually require extensive gaming and game engine knowledge – often used by professionals. In-game editors can be as simple as a character customization tool, or more complex level and map editors depending on the editor's target group and the editor goals.

Some mainstream games with level/map editors include *Age of Empires II* (Microsoft 1999), *TrackMania* (Naedo 2008), *Portal 2* (Valve 2011), *Trials Fusion* (2013) and the *LittleBigPlanet* series.

2.2.3 External editors:

An external editor is a stand-alone editor which is either released by the game developers, or released by a company which uses the same engine for several games. External editors released

by companies are called "source developer kit" (SDK). An example of a SDK editor is the *Hammer Source Editor*, where users can create levels for games which use the Source Engine, including popular games such as Left 4 Dead, Half Life, Portal and Counter-Strike (Valvesoftware 2017). The game engine *Unreal* has several different editors where users can create and modify everything from game levels to game physics (Unrealengine 2017). Some external editors can also be fan-made or created by third-party developers which is working independently. External editors are usually targeted towards users with an interest in game design, or professional working for a game studio. These tools are designed so users do not have to code or modify the game engine itself, which makes the editor easy to use for other game developers.

Unreal, *Unity*, *Source Engine* and *CryEngine* are examples of popular game engines which also have released and external editor made for enthusiasts and professionals (Worldofleveldesigns 2017).

2.3 User-generated content – ethics and rights

2.3.1 Ethics

Creating content can give players an opportunity to be creative and express themselves, but also reduces the expenses of game developers. There have been critiques that UGC is a way to involve unpaid work. Dyer-Witheford and Peuter (2005) explains how game developers are exploiting players to do free digital game labor as it is the players who are doing the developers job. Game editors are encouraging players to create content, but the contributions can be dissolving as there are no clear lines between "play" and "content provision" – because games are meant to be entertainment. Valve is however rewarding content creators by sharing revenues. By 2015, Valve had paid out more than 57 million dollars to content creators in various games (McWhertor 2015).

2.3.2 Rights

Players using in-game editors do not sit on any rights to the content which a player may have produced. Kelly and Plassaras (2015) explain how terms and license agreements take away the player's rights to own original content they have created in a game. Copyright laws do not apply to players as all rights falls to the game studios which owns the games. Most game studios use licenses which the players have to accept, usually involving the game and copyright

infringement, including game studios rights to all game content. All the games used in this research are protected by such licenses.

2.4 Exploring game editors and user-generated content research

Research reveals that there have been few studies regarding game editors and usability in video games. However, different sides of UGC have already been studied, which is tied to game creation through game editors. Understanding the players' motivation and player characteristics can give valuable information when designing an editor.

2.4.1 Study on LittleBigPlanet

A 2009 study of Italian PSN users revealed that 34,6% of the players surveyed own the PlayStation game LittleBigPlanet (LBP). LBP is using an in-game editor targeted towards players who do not need expert knowledge in level design or game development. According to the study, 21,2% of the LBP players had created and shared at least one game level. THE LBP game were more popular amongst younger players compared to older players, in terms of playing the game and creating content. 50% of the players who had created and shared a level was 19 years or younger (Comunello and Malargia 2009).

2.4.2 Study on user involvement in games

Niesenhaus (Niesenhaus 2009) have listed a proposal to categorize several degrees of user involvement in a table to compare player engagement, technical ability and preconditions of gamers. The table demonstrate how building and creating game content requires good understanding of game mechanics, game design and toolkit knowledge, and how creating content requires a higher degree of participation other than just playing the game.

Degree of Part.	Type of User Involvement	Preconditions of Users	Tools	Examples	Future Tools & Technologies
High	Creating own digital games	–Experienced Users -High skills in programming and 3d modelling tools	-Microsoft XNA -Visual Studio C++ -Maya, 3DS Max -Game-Engines	–Alien Hominid –Braid -Ragdoll KungFu -Crayon Physics	-MS Kodu –Programming by learning -Silverlight
High	Creating mods & total conversions	–Programming and scripting skills –Able to create own textures and models	–Engines, Toolkits -Visual Studio C++ -3DS Max, Blender -Photoshop	-Counter-Strike –WC3 DotA -Insect Infestation –Tower Defense	-Genetic algorithms -MS Popfly
Medium	Building content and assets	–Good understanding of game mechanics and / or design –Toolkit knowledge	–Level toolkits -Object editors -Photoshop	-Little Big Planet -The Sims 1 & 2 -Forza Motorsport -Spore	–Content creation will be part of the game
Medium	Writing fan fiction or creating fan art	-Talent for writing or arts	–Pen & Paper –Office applications -Photoshop -Web platforms	-Red vs. Blue (Machinima) –Blizzard.com/ Inblizz//Fanart/	–Extended video authoring tools
Low	Writing reviews & walkthroughs	–Basic understanding of game design, basic writing skills	–Office applications –Webpages -Blogs	-Gamespy.com –Gamefaqs.com -Supercheats.com	-Future community platforms
Low	Playing the game	-Interest in the genre and game world	No tools required	-Data Mining -Logfile Analysis	-Evaluation algorithms

Figure 1: Niesenhaus proposal to different types and degrees of user involvement (Niesenhaus 2009)

Niesenhaus also claims that developers save a significantly amount of time and money when players have tools available to create content: *A game developer costs an U.S. company around 90,000 dollars a year including all taxes and supporting costs (Siwek, 2007). A creation of a basic and runnable level design may cost a high-skilled developer one day, which makes about 350 dollars of the companies costs. More complex and high-quality designs may lead 63 up to one week or more, but in comparison to the quality of the user-created designs only one day per level design is calculated. Now, take 300.000 level designs created by the users of 'Little Big Planet' and multiply them with the costs of a basic level design done by a developer. This ends up with a total content value of more than 100 million dollars* (Niesenhaus 2009). Niesenhaus still points out that there will be some quality variations – however, level ratings can filter and differentiate levels based on user satisfaction and quality.

2.5 Studies on motivational uses of user-generated content

Different studies have been conducted to find more about players' motivations, and why players prefer to participate in creating content or not. In a 2011 study, a quantitative (a survey) and qualitative method (interviews) was used to learn more about the motivations of players to create content (Bosch, Looy & Ribbens 2011). The purpose of the study was to find what impact UGC had on the players, and what their motives were to create and share content. The results of the interviews revealed that the participants scored high on the set of motives especially within social and creative motivations, as they want to express themselves through content creations. 97 users where asked through an online survey on game forums of their play habits, and results showed that 81% of the respondents had used a game editor in the past, and 56% had completed a full level construction of an editor. 15% answered that they had engaged in mod creations, which means according to Niesenhaus (2009) that these players have a higher degree of user involvement compared to players who use game editors only.

Bosch, Looy & Ribbens (2011) refers to different types of creators; *Builders, Imaginers, Experimenters* and *Destructors. Builders tend to create content along a path of carefully consideration and thoroughly formed production methods. Imaginers, on the other hand, improvise "on the go" and seldom start with a well-defined concept of the end result in mind. Somewhere between the Builders and the Imagers fits the category of the Experimenters. This group of players create new content with the sole purpose of testing the limits of the tool or game environment. They build with a clear goal in mind but are less procedural than the Builders in their implementation of ideas. Destructors are players who build digital objects or environments in order to destroy them* (Bosch, Looy & Ribbens 2011). These player types have different characteristics and use the editor for different purposes. They also refer to another study where the motivations for using game editors were for entertainment and community purposes, thus confirming their motivational finding from the study. In another study, Ross et al. (2012) is referring to LBP players as *Explorers*, and states that these types of players are more curious and more open to use level editors and create content.

The interviews conducted by Bosch, Looy & Ribbens (2011) revealed that some of the respondents felt that creating content was too time consuming and too demanding. Also, some players felt that if they could not create new content which was valuable to the game, they were more likely to ignore the game editors.

Abend and Beil (2015) did an exploratory study where two focus groups were creating content through in Minecraft and the LBP editor. The findings revealed that the group who used the Minecraft editor had a much more analytical approach and used mathematics to calculate blocks for creating buildings, where the LBP players used a more playful ad hoc approach when creating a level. The LBP players also used items that were immediately available in the menus, and did not explore the menus further for other options and mechanics.

2.6 User-centered design when designing an editor

As Bosch, Looy & Ribbens (2011) and Ross et al. (2012) revealed, editor users have different motivations and characteristics. Using a user-centered design method is important when developing a game editor to know the player's needs – what they want to create when using the tool, and how they are using the tool. Developers need to differentiate between their own needs and player needs. For example; developers may want an advanced editor so players can create complex levels, but players may want an easy editor which is easy to learn (Lightbown 2015). Lightbown (2015) recommends using a variety of players as personas to focus on the user needs and finding the right balance between user needs and developer's needs. It is important for developers to know the players' motivations and characteristics, and then conduct usability testing accordingly (Lightbown 2015).

2.7 Why do usability testing?

Usability testing can help developers in the process to uncover errors and identify other problem related to the usability of an application. Usability testing can be a cheap and effective way of observing the users in a controlled testing environment, and collect quantitative or qualitative data to create a better product (Usability 2017).

2.8 Usability testing in games

Usability testing in games is called *playtesting*. According to Fullerton et al. (2008), playtesting is the single most important activity of a game designer. Playtesting is the alpha and/or beta stages of a game development process where the developers want players to play their game to test the game for bugs, flaws, usability issues, and receive player's opinion of the game. Conducting playtesting will prepare the game for release, and aid developers to create a game which meets the players' expectations. Playtesting is a part of an iterative process where the

game should be tested in the entire design process, just like when user testing other software. Usability testing in games involves testing with multiple users at the same time, for example in multiplayer games, whereas mainstream user testing is usually tested at one user at the time to observe user behavior and details (Fullerton et al. 2008, Nielsen 2016). For large game studios, playtesting is a part of a term called Game User Research (GUR). Studios such as Ubisoft and Microsoft have a research team dedicated to GUR. GUR includes methodologies such as playtesting, data analysis, observation, interviews, questionnaires and other suitable methods for improving the game experience (Gamesuserresearchsig 2017).

2.9 Usability testing in game editors

Usability testing a game editor is not comparable to regular playtesting of a game. When playtesting a game, game developers are usually interested in metrics such as gameplay, game mechanics and player emotions. When usability testing a game editor, there are two specific measurements game developers should focus on; efficiency and learnability (Lightbown 2015).

2.9.1 Efficiency vs. learnability

Efficiency is measuring how effectively a user can complete a task or a set of tasks. An efficient game editor will allow players to create levels in a way that users can go from one task to another without spending much time navigating through the user interface. Tools with limited possibilities are often suited for high efficiency, as users are limited to a certain number of items, tools and options (Lightbown 2015).

Learnability can be measured by how well the user is able to understand and use the editor without having much knowledge about the editor or editors in general – and if there are a progress in the tasks which has been given. Learnability is important if the goal is for new user to quickly learn and understand the editor, even if the user have little to no experience in using game editors (Lightbown 2015).

Improving learnability in an editor can often have an effect on the efficiency of the editor tool. Lightbown (2015) suggest compromising based on what the goal and the target group of the editor is, as it is very hard to find a good balance between an efficient and a learnable tool to suit the needs of all user groups.

If the tools are difficult to use, the user may stay as beginners for a longer time, as it will take longer for the user to understand the tool and become more experienced. Improving the learnability may ensure that users are able to advance from a beginner phase, and is able to use the tool to without spending too much time thinking what actions they should make (Lightbown 2015).

3 Methodology

There are several types of editors where players can create various types of content, but this research is focused on in-game level editors (Chapter 2.2.2), as these editors are the most common, and are designed for most players. 4 level editors will be tested and compared by using two different methods, survey and usability testing. Surveys were distributed to gather player data, and user testing with five participants were conducted to do a usability test of each editor. The results are cross-compared to each other, and the usability testing is compared to the principles from Lightbowns *Designing the User Experience of Game Development Tools* (2015).

3.1 The games

Four games; Portal 2 (Valve), Grand Theft Auto (GTA) V (five) (Rockstar Games), LittleBigPlanet (LBP) 3 (Media Molecule) and Trials Fusion (TF) (RedLynx) were chosen based on these criteria:

- Have a sufficient community/communities for collecting player data from at least 100 respondents in an anonymous survey.
- World (3D) and/or platform (2D) based games in either first person or third person.
- In-game based level editor
- The game editor should allow players edit and modify an existing game world, or let players create a new level.
- The game editor must be developed by the game studio, and not a separate, third party tool developed by independent studios or players.
- The game must be available on gaming console (Xbox, PlayStation) and/or Windows.
- The game editor should be usable for players with low technical skills, meaning that the players should not need extensive knowledge about game physics, game mechanics or other type of knowledge which makes the editor not suitable for beginners.

Two different gaming platforms were used – PC (Portal 2, TF) and PlayStation 4 (LBP 3, GTA V) – to explore the differences between a computer editor and a console editor, especially the

game controls, as players who use console are limited to a game controller with few buttons and joysticks, compared to a computer where keyboard and a mouse is used for more precise and flexible actions.

3.1.1 GTA V:

GTA V is an action/adventure game developed and published by the game studio Rockstar. The game was released for Xbox 360 and PlayStation 3 in 2013, followed by a 2014 release on Xbox One and PlayStation 4. In 2015, the game was released on PC for Windows and has sold over 75 million copies as of February 2017 (Macy 2017). GTA V is an open-world game set in a fictional place called Los Santos, where players can roam freely in a large game world, including several "sandbox" elements (as mentioned in Chapter 2.2.1) where players can edit and construct the game world through missions (Breslin 2009). The game allows players to switch between first-person and third-person view when driving a vehicle or roaming on foot. Missions, tasks and heists can be accesses in-game by consulting NPCs (Non-player characters) or seek out certain spots in Los Santos. The game does not follow linear trajectories or a certain story line, but as a narrative mission where players can choose if they want to participate or not. There are several different missions as well with different play elements and player goals such as racing, parkour, bank robbery, assassinations and shootouts. The game can be played in multiplayer mode with up to 30 other players, or alone in a single player mode.

The game editor in GTA V is called the GTA Creator. The editor lets players make modifications anywhere in the game world to create races, missions and scenarios. The scenarios must be shared with other players, as it requires at least 2 players for a mission to start. The creators have access to different items which can be placed into the game world, as well as adding computer controlled players. Players can also apply their own game rules and objectives, further described in Chapter 2.1.

Figure 2: GTA screenshots

3.1.2 LittleBigPlanet 3:

LBP 3 is the third game in the LBP series, and is a 2D side-scrolling puzzle game released on PlayStation 3 and PlayStation 4 in 2014. The game is developed by Media Molecule and distributed by Sony Computer Entertainment, and the story line is set in the fantasy world "Bonkum", where evil powers are trying to take over the world. The players control different toy like characters, and the game goal is to advance in a linear path from point A to point B with tasks and challenges the players needs to solve along the way. The game has a singleplayer mode and a multiplayer mode with up to four players. The game relies heavily on UGC, as the story line only contains a handful of levels.

The editor lets players start with an empty level, as players are supposed to create a level from scratch by using a variety of items, objects and options. The players have access to lots of different items, shapes, bases, game options and other tools depending on the complexity of the creation. The editor allows players to use their creativity, and some examples of levels which have been created are a Titanic themed level and a Star Wars themed level (Meegan 2016). Players can choose between the basic editor, or unluck more options by switching to advanced mode, but the default mode is set to simple/standard creator mode. As of November 2014, there were over 9 million user created levels (Bakalar 2014).

Figure 3: LBP 3 screenshot

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3.1.3 Trials Fusion:

Trials fusion is an arcade-style racing platform game developed by RedLynx studio, and published by Ubisoft. It is the fifth game in the trials series, and was released in 2014 on PC, Xbox One, Xbox 360 and PlayStation 4. By February 2015, the game had sold over 1.7 million copies (Moser 2015). The game is a 2D side-scroller like LBP 3, but uses 3D graphics, and the game is played in different settings such as construction sites, winter landscape, urban environment and desert. The game play is simple, as the players only drives in a straight direction over obstacles, controlling only the speed, brake and balance of the bike by using the arrow keys on the keyboard. The game objective is time trialing or scoring a minimum amount of points by doing tricks.

The player can create a track anywhere in a large open-world map, and there are no constraints in terms of track length. The only game premise is that the track has to be relatively straight, although some slightly bent turns are allowed. Obstacles and other elements can then be added and placed in the track, or around the track as decoration. The level can be published and downloaded by other players in-game through a "track central" options in the menu. As of April 2017, 134.000 tracks have been published and are playable for other players.

Figure 4: TF screenshot

3.1.4   Portal 2:

Portal 2 is the second game in the Portal series, developed and released by Valve Corporation in April 2011. The game is a puzzle-platform game set in first-person, distributed on PC, Xbox 360 and PlayStation 3. By April 2012 the game had sold 4 million copies (Caoili 2012). The player controls a female character named Chell, and the game objective is to use a gun to create portal dimensions to solve puzzles. The game has a single player and a multiplayer cooperation mode.

The game editor for Portal 2 was released in June 2012, one year after the original game release. The game editor was partially designed to be a tool for physics and mathematics teachers to teach students about science – and therefore created in collaboration with teacher and students to be used for education. In 2012, the editor was used by over 2500 teachers worldwide (Salen 2012). Since then, an educational program called "Teaching with Portals" has been launched for teachers to create different physics exercises (Salen 2012). Valve UX-designer Yasser Malaika has previously stated that the tool is designed to be easy-to-use and not require any tutorial time (Alexander 2012). The published levels will appear on the Steam Workshop, where other players can download and play the levels (Steam Workshop 2017). As of April 2017, over 571.000 levels have been created and published through the Steam Workshop (Steamworkshop 2017). As mentioned in Chapter 2.2.3, Portal 2 also has an exeternal editor, the *Hammer Source editor*.

Figure 5: Portal 2 screenshot

3.2 Method 1: Survey

Survey is a cheap and effective way to gather statistical data, and can be easily distributed to a large number of people, for example through internet. To seek answers the research questions – specifically 1 and 2 – general player information is needed, as well as the players characteristics and opinions of the editors. Players are asked to define what they see themselves as; casual, core or hardcore gamers (see Abbrevations and Terminology), and information such as age, player aspects and editor habits are collected. To gather the respondents optinions of the editor, the respondents are asked to rate the editor on a scale of 1 (easy) to 10 (hard), so the data can be easily comparable for quantitative analysis, in combination of the usability testing. The aim of the survey is to explore what type of players find the editor easy to use, and cross-compare the surveys to find coherences. The survey questions are located in Appendix A. The surveys were distributed to different gaming communities related to the specific games;

- **GTA V:** reddit.com
- **LBP 3**: playstationtrophies.org, reddit.com, lbpcentral.com, littlebignetwork.com and littlebigforum.eu
- **Portal 2:** reddit.com
- **Trials Fusion:** reddit.com, steamcommunity.com and forums.ubi.com

Distributing the surveys to the specific game communities should increase the chance to direct the surveys for the intended target groups. This should provide more accurate results as there is a greater chance that the respondents play the game, and avoiding submissions from players who do not play the game if the survey were to be distributed through general gaming communities. The communities were chosen as they were the largest communities for each game, as well as platform independent communities.

3.3 Method 2: Usability testing

A usability test is a qualitative method used to evaluate a product – in this case the different editors – through users. The aim of the usability test is to see how users with little to no experience interacts with the different editors – as this method should provide answer to research question 1 and 3. Several usability guidelines are used to understand the errors and problems that occurs when a user interacts with an editor, further outlined in Chapter 3.7. During the user test, general observation notes are taken related to user actions and user behavior. The usability testing was conducted under controlled environments and instructions

task instructions were given to the participants. 5 users were recruited to find usability problems and maximize the effort and resources required to produce the results needed for answering the research questions (Nielsen 2000).

3.3.1 Interviews and questionnaire

Questionnaires were handed out and interviews were conducted immediately after the user testing of each editor to clarify the observations, and gather opinions about the editors. Before the interview, questionnaires were handed out to rate the different aspects of the editor on a scale of 1 to 10, such as usability, categorization and game controls (see Appendix D). The participants were also asked how easy/hard they found the editors to use, and the results are cross-compared to the survey results in Chapter 4.3. The participants were then able to give their opinions about the editors through the interviews (Usability.gov 2016).

3.3.2 Selection of participants

Five participants were selected to participate in the usability testing of the editors. The participants were selected through nonprobability convenience sampling. The participants age ranges from 18 to 31. Casual, core and hardcore gamers were recruited for variety, to make sure different age and gamer groups are represented. However, none of the participants had any experience with a level editor. The aim of the user test is to see how participants with little to no experience interacts with the editor, and provide data to answer research question 1 and 3. All participants own a computer and a gaming console system and are used to playing with game controllers. All participants are Norwegians, but were comfortable by using English as the game and interview language, to make sure words would not get lost in translation. If the respondents did not understand some of the terminologies in the questionnaire, they could ask for clarification.

3.3.3 Tasks

The tasks are designed as basic beginner tasks, and should not require a user to be an expert or require further knowledge about the game editors or the games. The most complex functionalities usually require a full playthrough to know all functions. This study focuses on the learnability and uncovering usability problems – especially with beginners in mind - so the goal is to see what problems they encounter. It is also interesting to observe if the users have some sort of progress during the tasks. The participants are given specific tasks such as adding a start/exit, add items/props and include basic core functions into the game and do iterative testing. Lightbown (2015) explains that giving specific tasks is important when doing editor

usability testing, as the goal is to measure usability and not creativity. Specific tasks are also used to give users clear goals and avoid misunderstandings (Lightbown 2015). The tasks are designed so the users have to use different game functions, different game options and different menus. The results are cross-compared to the guidelines of usability testing in game editors mentioned in Chapter 3.7. The tasks were created and organized in collaboration with an experienced, professional level designer.

The trials were randomized for each participant, so the different participants would play the games in different orders, in case if the ratings for the 2nd, 3rd and 4th game are based on the ratings from the first editor.

The users were given a time limit to complete each task, and the time limit varied depending on the complexity of the task, but is set so the participants should be able to complete it within reasonable time as beginners. If the participants have not completed the task within the time limit, the user will move on to the next task, and the task will be set as "incomplete".

3.4 Usability guidelines

Guidelines based on *Designing the User Experience of Game Development Tools* by Lightbown (2015) are used to uncover problems and errors during the user testing. The guidelines are designed to improve learnability and efficiency – depending on the editor goals – as outlined in Chapter 2.9.1. Furthermore, this study focuses on users with little to no experience with editors, which means learnability is the priority when comparing the guidelines to the specific user actions and usability problems (Chapter 5.2).

3.4.1 Constraints

Constraints are using limitations to what a user can do with an editor. The purpose of constraints is to reduce the amount of mistakes a user can do, for example by setting a limitation to where the user can build in a map, preventing the user from making mistakes and errors. Constraints will help the user to focus on their tasks, reduce the user's mental capacity as the editor gives the users a set of boundaries. By limiting the user's options – it reduces the complexity – and therefore improving the learnability of the editor (Lightbown 2015).

3.4.2 Natural mapping and representation

Natural mapping means that the editor will perform in a way which matches the user's expectation. For example, by moving the joystick on a game controller to the left, the user will probably expect a movement to the left on the screen. Bad mapping can result in an editor which is harder to use, as it may force the user to perform actions which does not match the user's expectation to what will happened, thus have an "unnatural" learning curve. Actions and interface should match the user's expectation (Lightbown 2015).

3.4.3 Feedback and feed forward

Feedback is the communication between the editor tool and the user after the user has performed an action. Feedback should be provided by the editor for example by notifications if the user makes an error, or giving feedback that a user action was performed successfully – for example when saving. Feed forward is the opposite of feedback. Instead of communicating with the user after the user have performed an action, the editor tool can provide feedback before user performs an action, for example by previewing what will happened if user place an item on the map, or warn the user if an action will lead to an error. Feedback and feed forward will help the user to understand the tool more quickly (Lightbown 2015).

3.4.4 Grouping

Grouping is categorizing related content together which matches the user's mental model, by what's logical to the user. For example, by grouping items in "city" and "forest", the user should know where to look when trying to find a tree or a skyscraper. By grouping content effectively, the user will spend less time looking for content and allowing users to adapt to the game editor faster (Lightbown 2015).

3.4.5 Progressive disclosure

Progressive disclosure is when the editor and the interface begins in a simple mode, allowing the user to disclose more options, one piece at the time progressively, to suit the player's needs. This can help the users to get a grasp of the editor, without being overwhelmed by all features and options at once and thus have a big impact on learnability. It can also make the editor more efficient, as the users do not have to spend time looking and figuring out where to find the different tools and items (Lightbown 2015).

3.4.6 Subjective opinions

The participants are asked to rate the various aspects of the editor from a scale of 1 to 10. Participants are also asked to give their opinion and overall satisfaction with the editors. User opinions will be compared to the observation notes taken.

4 Results

4.1 Survey results

Further survey analyses of each survey and additional results can be located in Appendix B.

Table 1.A Total respondents

GTA V	Portal 2	LBP 3	TF
276	271	100	100

4.1.1   General player information

Table 2.A I am a

Gender	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
Male	93,8%	85,1%	89%	97%
Female	6,2%	14,9%	11%	3%

Table 3.A Have you used the in-game editor?

Answer	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
Yes	50%	55%	90%	97%
No	50%	40%	10%	3%

Table 4.A How old the players are

Age	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
0-19	44,2%	53,2%	63%	25%
20-25	30,8%	30%	14%	36%
26-30	10,1%	7,9%	13%	12%
31-40	8,3%	5,6%	8%	19%
41-55	5,8%	3%	-	7%
56+	0,7%	0,4%	2%	-

Table 5.A Age of the respondents who have used the editor

Age	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
0-19	44,2%	67,3%	59,6%	48,6%
20-25	30,8%	25,9%	14,4%	29,7%
26-30	10,1%	4,1%	11,1%	8,7%
31-40	8,3%	2%	6,7%	5,8%
41-55	5,8%	0,7%	-	7,2%
56+	0,7%	-	2,2%	-

Table 6.A Age of the respondents who have not used the editor

Age	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
0-19	48,6%	35,8%	40%	20,8%
20-25	29,7%	35%	10%	54,2%
26-30	8,7%	12,5%	30%	8,3%
31-40	5,8%	10%	20%	12,5%
41-55	7,2%	5,8%	-	4,2%
56+	0%	0,8%	-	-

Table 7.A The respondents play the game on (respondents may choose several options)

Platform	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
PC/MAC	54,3%	91,3%	-	50,5%
Xbox 360	6,2%	13,4%	-	13,1%
Xbox One	19,6%	-	-	39,4%
PlayStation 3	6,9%	11,5%	-	-
PlayStation 4	32,6%	-	100%	33,3%

4.1.2 General questions for all respondents

Table 8.A What aspects are important to you when playing a game? (Respondents may choose more than one option)

Aspects	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
The competitive aspect	41,8%	36,2%	33%	74,7%
The creative aspect	68,9%	89,8%	89%	54,5%
The social aspect	60,8%	30,9%	52%	41,4%

Table 9.A I see myself as

Type of gamer	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
Casual gamer	35,4%	35,4%	31%	11%
Core gamer	47,7%	47,7%	56%	49%
Hardcore gamer	17,2%	17,2%	13%	40%

Table 10.A User-generated content is a crucial factor for me when buying/playing a game

Statement	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
Strongly disagree	5,4%	7%	5%	2%
Disagree	14,1%	15,6%	10%	14%
Neutral	47,8%	47,7%	50%	31%
Agree	27,5%	25,2%	25%	38%
Strongly agree	5,1%	4,8%	10%	15%

4.1.2.1 Question for respondents who have not used the editor

Table 11.A What is the reason you do not use the level editor? (Respondents may choose more than one option)

Reason	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
The level editor is hard to use	2,2%	2,5%	-	20,8%
I find level creation boring/time consuming	35%	26,4%	10%	33,3%
I do not see myself as creative enough to come up with good ideas for a level	45,3%	49,6%	30%	58,3%
I prefer to just play content generated from other players	62%	57%	40%	79,2%
I have just started playing the game, but I would like to try it in the future	7,3%	10,7%	40%	8,3%
Other	5,8%	13,2%	20%	-

Table 12.A Do you engage in level creation/mod creation in other games?

Answer	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
Yes	24,6%	50,3%	40%	12,5%
No	75,4%	49,7%	60%	87,5%

4.1.2.2 Questions for respondents who have used the editor

Table 13.A Have you completed and shared a level?

Answer	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
Yes	34,8%	23,6%	24,4%	17,3%
Yes, I have completed and shared several levels	35,5%	27%	61,1%	54,7%
Yes, I have completed a level, but not shared it with anyone	15,9%	25%	7,8%	13,3%
No	13,8%	24,3%	6,7%	14,7%

Table 14.A Do you engage in level creation/mod creation in other games?

Answer	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
Yes	24,6%	50,3%	68,9%	39,5%
No	75,4%	49,7%	31,1%	60,5%

Table 15.A How many hours have you spent playing the game?

Hours	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
0-10 hours	5%	7%	12,2%	3%
11-100 hours	54,3%	62,5%	30%	22,7%
101-1500 hours	40,7%	30,5%	57,8%	74,3%

Table 16.A How many hours have you spent creating levels in the game?

Roughly estimated in hours	Percentage of respondents			
	GTA V	Portal 2	LBP 3	TF
0-10 hours	71,7%	69,1%	26,2%	53,2%
11-100 hours	21,1%	23,9%	26,2%	19,5%
101-1500 hours	7,2%	7%	47,6%	27,3%

4.1.3   Average ratings of the editors

The respondents who have used the in-game editor were asked to rate the game editor based on a scale of 1 (easy to use) to 10 (hard to use).

Table 17.A Average rating of each editor by all respondents

GTA V	Portal 2	LBP 3	TF
5.72	4.49	5.27	5.71

Table 18.A Average rating of each editor by age

Age	Average rating			
	GTA V	Portal 2	LBP 3	TF
0-19	5.96	4.96	4.97	6.10
20-25	5.61	4.05	5.85	5.35
26-30	5.17	3.67	6.40	5.97
31-40	5.13	6.33	6.33	5.50
41-55	5.80	4.96	-	6.50
56+	-	4.05	1	-

Table 19.A Average rating of each editor by gamer type

Type of gamer	Average rating			
	GTA V	Portal 2	LBP 3	TF
Casual gamer	6.19	4.17	5.08	5.13
Core gamer	5.61	4.61	4.61	5.56
Hardcore gamer	5.55	4.63	4.63	6.03

Table 20.A Average rating of each editor by creative vs. non-creative aspect

Aspect	Average rating			
	GTA V	Portal 2	LBP 3	TF
Creative	5.81	4.52	5.39	5.43
Non-creative	5.51	4.12	4.57	6.12

Table 21.A Average rating of each editor by gaming platform

Gaming platform	Average rating			
	GTA V	Portal 2	LBP 3	TF
PC/MAC	5.91	4.27	-	5.77
Console	5.46	5	5.27	5.65

Table 22.A Average rating of each editor by level completion

Answer	Average rating			
	GTA V	Portal 2	LBP 3	TF
Yes	5,71	4.43	4.91	5.77
Yes, I have completed and shared several levels	5.51	3.92	5.18	5.51
Yes, I have completed a level, but not shared it with anyone	6.18	4.86	6.00	5.90
No	5.79	4.83	6.50	6.18

4.1.4 Summary

Most respondents are males (ranging from 85-97% of the respondents), and the majority of the respondents are 19 years or younger, except the TF respondents where the majority are 20-25. The respondents usually play their games on a computer, but several respondents play on two or more platforms. 45-55% of the respondents are core gamers, 25-35% are casual gamers and roughly 15% are core gamers – except TF where 40% are hardcore gamers and 10% are casual gamers.

The respondents who have not used the editor would rather just play content created by other users, and they often do not see themselves as creative enough to come up with good ideas for a level. User-generated content is not a crucial factor for most respondents when buying or playing a game, except for the TF respondents, where most respondents agree to the statement. The Portal 2, GTA V and LBP 3 players find the creative aspect most important, but the TF players finds the competitive aspect most important. Respondents who have used the editor are more likely to use other editors, compared to the respondents who have not used the editor.

The average rating for the four editors were 4.49 (Portal 2), 5.27 (LBP 3), 5.71 (TF) and 5.72 (GTA V). The rating results are often diverse, where the two most frequent ratings are in the low end or in the high end of the scale. The respondents are more likely to find the editor easy to use if they have completed and shared several levels, and those who have not completed a level are the ones who find the editor hard to use. There is no clear correlation to age and ratings through the surveys, as it is dependent on which editor the respondents use. For the GTA V

survey, the 0-19 age group have the highest average rating among all age groups, but for the LBP 3 survey, the 0-19 age group have the lowest average among all age groups. There is also no clear correlation between the aspects and the ratings of the editor, as the ratings between those who value the creative aspect and the who do not are often differentiated by a small margin. There are some margins between casual gamers and core and hardcore gamers, but for the TF and Portal 2 editor, the casual gamers find the editor easiest to use among the gamer groups, while casual gamers amongst the GTA V and LBP 3 respondents finds the editor hardest to use among the gamer groups.

4.2 Usability results

The user testing was conducted over a month period, where the participants were user testing two game editors in each session, which means each participant had two sessions of user testing. The participants were asked to think out loud, and also express their emotional response when using the editor (if they are getting frustrated, angry, surprised etc.). All participants were observed for each task, and observation notes were taken. After the user testing of each editor, the participants were interviewed regarding the editor they just used. They were asked about their opinion of the different aspects of the editor, and asked to rate these aspects on a scale from 1 to 10.

The participants were first given some time to play the game so they understood the game goals, game mechanics and its core functions. The participants were given 20-30 minutes of playtime, depending on the complexity of the game. The participants were asked if they had enough understanding of the game to use the editor, which had to be confirmed before moving onto the game editor usability testing. The participants viewed some game tutorials before each editor, except for Portal 2 which didn't have a tutorial – instead the participants were allowed to play with the tutorial for a few minutes. The participants were told to talk out loud when performing each task, which was practiced during the play session. The participants were informed that they could ask for clarification if they did not fully understand the task that were given, but could not ask for help or suggestion on how to solve the task. The participants were sometimes asked what buttons or keys were used to perform a specific action when using the editor in a task.

The participants were asked to perform a set of tasks. If the participant were able to complete the task, a new task was given. If the participant failed to complete the task within the time limit, the tasks would be incomplete, before the participant would move on to a new task. The time limit is given to stop the participants if they cannot figure out how to complete a task. Time-on-task is otherwise not measured.

4.2.1 GTA V:

4.2.1.1 Tasks:

The participants were asked to perform a total of 20 tasks of various complexity and difficulty (see Appendix C.1), one task at the time. Each participant had a time limit to complete each task. If the time limit was exceeded, the participants were asked to move onto the next task. The time limit it set so users should have sufficient time to complete the task, and not stay at the same task for a long period of time.

4.2.1.2 Task completion

Table 1.B Task completion

Participants	Age	Gamer type	Task completion
Participant 1	19	Hardcore gamer	20/20
Participant 2	24	Core gamer	20/20
Participant 3	25	Casual gamer	20/20
Participant 4	26	Casual gamer	20/20
Participant 5	31	Core gamer	20/20

All participants were able to complete each task within the time limit.

4.2.1.3 Observations

The participants were spending most of the time looking for the specific items/objects, and they had sometimes trouble locating the correct item/object based on the category names. They were quickly able to understand the game controls and mechanics of the editor, however, 2 of the participants had trouble finding out how to pick up an item on the map. All participants were reading the game instructions provided by the game, and if error occurred, they were able to correct the error based on the game's feedback. The participants were quickly able to save and the level.

Usability issues observed

- 1 participant expressed that the controls were slow and somewhat unresponsive.
- 2 participants had trouble picking up items and objects on the game map.
- The participants often had to guess which category an item or object was placed under.
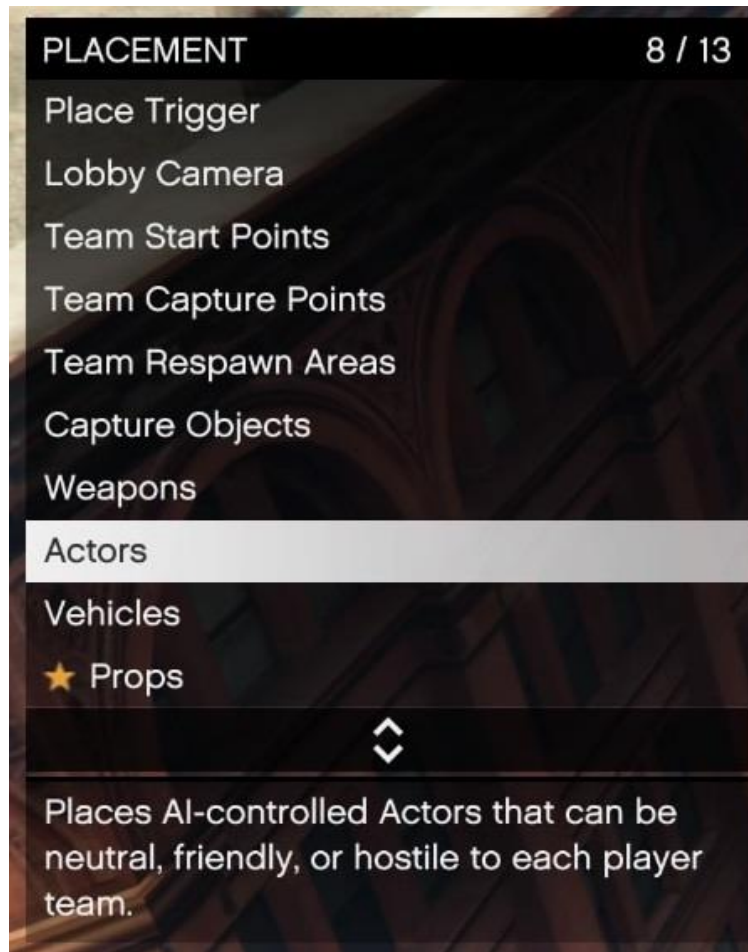
Figure 6: The global menu in the GTA V editor. The participants felt the navigation and finding items were easy, except they did not immediately knew which category to look for certain items.
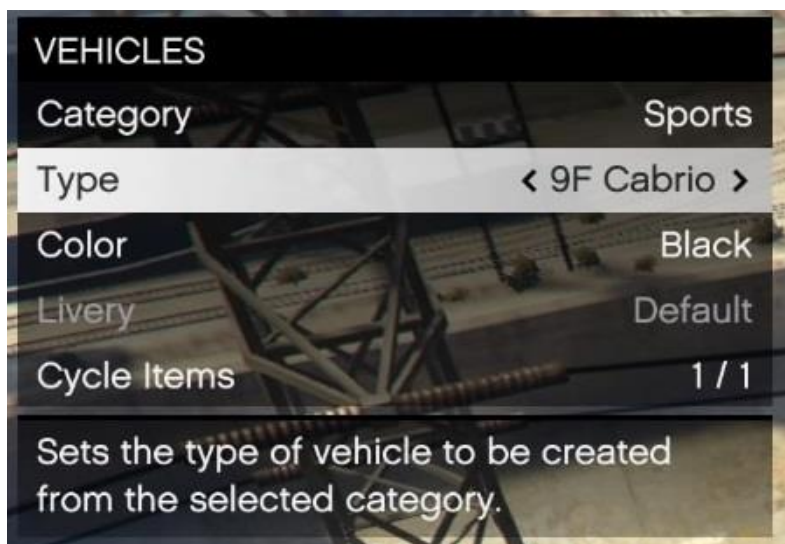
Figure 7: Navigating through a category

4.2.1.4 Editor ratings

Table 2.B On a scale of 1 (easy) to 10 (hard), how easy/hard was it to use the editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	1
Participant 2	24	Core gamer	3
Participant 3	25	Casual gamer	2
Participant 4	26	Casual gamer	3
Participant 5	31	Core gamer	2

Table 3.B On a scale of 1 (bad) to 10 (good) how would you rate the <u>usability</u> of the game editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	8
Participant 2	24	Core gamer	9
Participant 3	25	Casual gamer	8
Participant 4	26	Casual gamer	6
Participant 5	31	Core gamer	7

Table 4.B On a scale of 1 (bad) to 10 (good), how would you rate the <u>game controls</u> of the game editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	8
Participant 2	24	Core gamer	10
Participant 3	25	Casual gamer	9
Participant 4	26	Casual gamer	10
Participant 5	31	Core gamer	9

Table 5.B On a scale of 1 (bad) to 10 (good), how would you rate the <u>categorizations</u> of menus and items?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	9
Participant 2	24	Core gamer	9
Participant 3	25	Casual gamer	9
Participant 4	26	Casual gamer	10
Participant 5	31	Core gamer	9

Table 6.B On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>playing the game</u>?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	9
Participant 2	24	Core gamer	10
Participant 3	25	Casual gamer	8
Participant 4	26	Casual gamer	10
Participant 5	31	Core gamer	9

Table 7.B On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>using the editor</u>?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	2
Participant 2	24	Core gamer	3
Participant 3	25	Casual gamer	6
Participant 4	26	Casual gamer	3
Participant 5	31	Core gamer	4

4.2.1.5 Interviews

All participants felt the editor was fairly easy to use, as they didn't encounter any particular problems. They liked the game and camera controls, although one participant felt the camera was a little bit slow. 4 of 5 participants felt there it was just the right amount of options and items, not too few or too many. One participant felt there should be fewer options and fewer items, as he had trouble locating some of the items and objects in the menus.

4.2.3 Portal 2:

4.2.3.1 Tasks:

The participants were asked to perform a total of 11 tasks of various complexity and difficulty (see Appendix C.2), one task at the time. Each participant had a time limit to complete each task. If the time limit was exceeded, the participants were asked to move onto the next task. The time limit it set so users should have sufficient time to complete the task, and not stay at the same task for a long period of time.

4.2.3.2 Task completion

Table 1.C Task completion

Participants	Age	Gamer type	Task completion
Participant 1	19	Hardcore gamer	11/11
Participant 2	24	Core gamer	11/11
Participant 3	25	Casual gamer	11/11
Participant 4	26	Casual gamer	11/11
Participant 5	31	Core gamer	11/11

All participants were able to complete each task within the time limit.

4.2.3.3 Observations

The participants had no trouble finding specific items/objects, as they only had one game menu with some items listed. They were quickly able to understand the game controls and mechanics of the editor such as rotating the camera angle using the middle mouse button. 4 participants did not know how to make the room bigger immediately. To make the room bigger, the user needs to mark the walls using the left mouse button and then drag the walls by moving the mouse. The participants were trying to do it through the game menu or clicking using the right mouse button at first, but after some time, they understood how to do it correctly by trial and error. Participant 1 were immediately able to understand which actions had to be performed to expand the walls. 2 participants did not know they had received a game error when they had placed an item in the air. The participants were quickly able to save and test the level.

Usability issues observed

- 4 participants had trouble finding out how to expand the room, but were able to do it through trial and error, before figuring out how to do it correctly.
- 2 participants did not immediately understand an error had occurred.
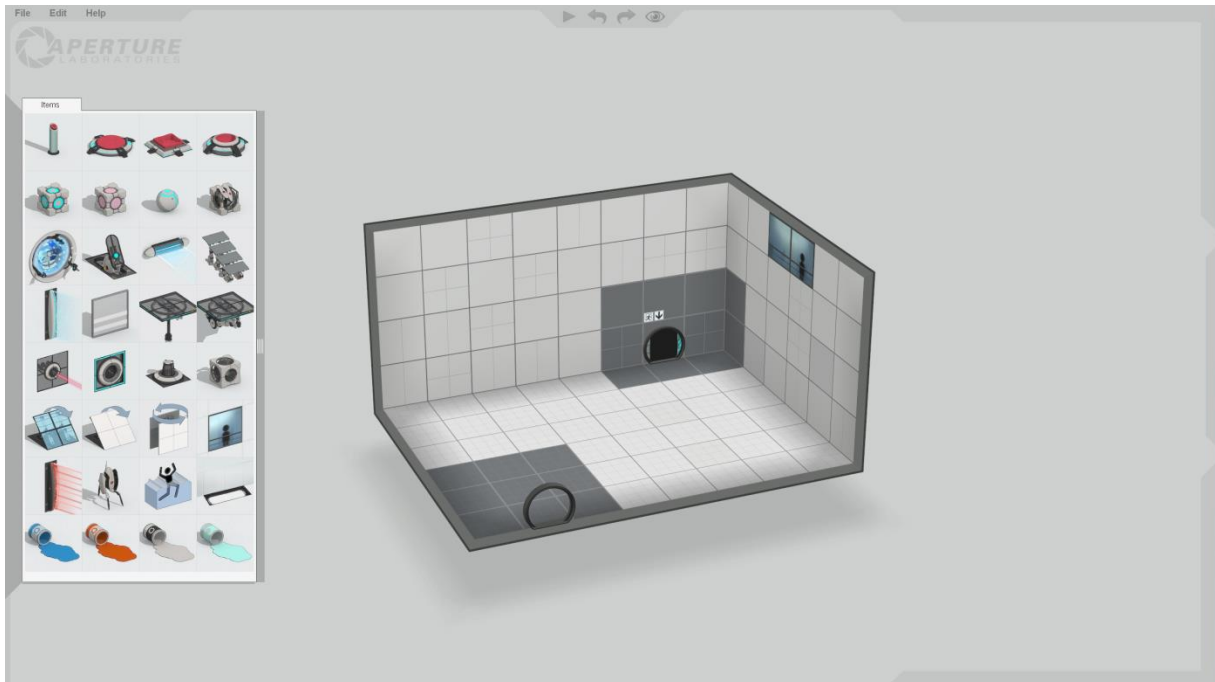
Figure 8: An overview of the user interface in the Portal 2 editor. The editor is providing the user with a default room when creating a new level, which the user may edit. The editor contains only one game menu, located to the left
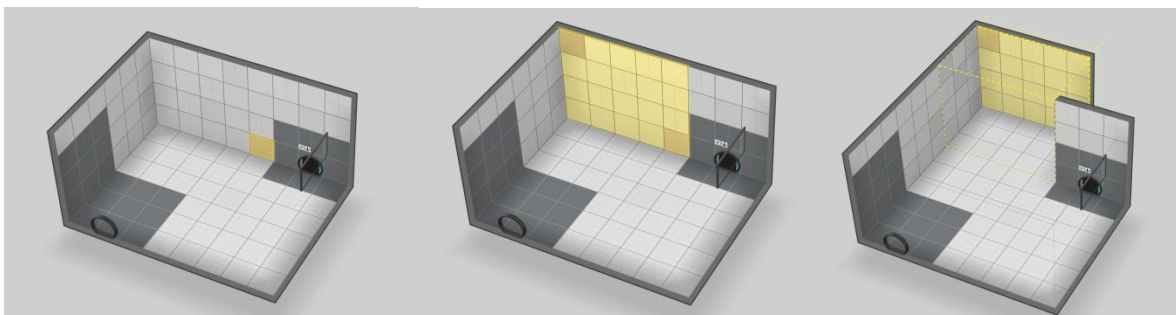
Figure 9: To expand the room, the user needs to select one tile and hold left mouse button while dragging to select a part of the wall, and then place the mouse button to the top of the wall in order to expand (or shrink) the wall

4.2.3.4 Editor ratings

Table 2.C On a scale of 1 (easy) to 10 (hard), how easy/hard was it to use the editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	2
Participant 2	24	Core gamer	1
Participant 3	25	Casual gamer	2
Participant 4	26	Casual gamer	4
Participant 5	31	Core gamer	1

Table 3.C On a scale of 1 (bad) to 10 (good) how would you rate the <u>usability</u> of the game editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	10
Participant 2	24	Core gamer	9
Participant 3	25	Casual gamer	7
Participant 4	26	Casual gamer	6
Participant 5	31	Core gamer	8

Table 4.C On a scale of 1 (bad) to 10 (good), how would you rate the <u>game controls</u> of the game editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	9
Participant 2	24	Core gamer	8
Participant 3	25	Casual gamer	10
Participant 4	26	Casual gamer	10
Participant 5	31	Core gamer	10

Table 5.C On a scale of 1 (bad) to 10 (good), how would you rate the <u>categorizations</u> of menus and items?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	10
Participant 2	24	Core gamer	9
Participant 3	25	Casual gamer	8
Participant 4	26	Casual gamer	10
Participant 5	31	Core gamer	8

Table 6.C On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>playing the game</u>?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	9
Participant 2	24	Core gamer	10
Participant 3	25	Casual gamer	10
Participant 4	26	Casual gamer	10
Participant 5	31	Core gamer	9

Table 7.C On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>using the editor</u>?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	7
Participant 2	24	Core gamer	6
Participant 3	25	Casual gamer	7
Participant 4	26	Casual gamer	8
Participant 5	31	Core gamer	8

4.2.3.5 Interviews

All participants felt the editor was fairly easy to use, as they said they didn't encounter any particular problems. They felt the editor was very easy to get into as beginners, and were pleased with how easy it was to use. They liked the game and camera controls, and had no problem understanding the controls and game mechanics when working with the editor. All participants liked that there weren't too many menus, and only one menu containing objects and items. Two of the participants commented that they would like to try out the editor later sometime. Two of the participants would like a tutorial or some form of game instructions, as not everything was clear to them what to do, and mentioned the expansion of the room. One of the participants commented that the editor was somewhat similar to a Microsoft program.

4.2.4   LBP 3:

4.2.4.1   Tasks:

The participants were asked to perform a total of 16 tasks of various complexity and difficulty (see appendix C.3), one task at the time. Each participant had a time limit to complete each task. If the time limit was exceeded, the participants were asked to move onto the next task. The time limit it set so users should have sufficient time to complete the task, and not stay at the same task for a long period of time.

4.2.4.2   Task completion

Table 1.D Task completion

Participants	Age	Gamer type	Task completion
Participant 1	19	Hardcore gamer	16/16
Participant 2	24	Core gamer	14/16
Participant 3	25	Casual gamer	10/16
Participant 4	26	Casual gamer	14/16
Participant 5	31	Core gamer	15/16

Participant 1 was able to complete each task within the time limit.

Participant 2 did not complete task 1 & 2.

Participant 3 did not complete task 1, 2, 3, 4, 5 & 14.

Participant 4 did not complete task 4 & 5.

Participant 4 did not complete task 14.

4.2.4.3   Observations

All participants were spending most of the time looking for the specific items/objects, and had usually trouble locating the correct item/object based on the category names. All participants were also confused by some of the menu names, for example "global stuff". 3 participants got somewhat frustrated by the game and camera controls, as they felt the camera animation was hard to manage. All participants struggled with task 3, and did not immediately know how to create a basic platform, but had to spend time by trial and error, but 2 of the participants were still not able to complete the task. The participants quickly understood how to place, edit, delete and pick up items and objects, but 2 participants could not find out how to create a platform at

the inner level to complete task 14. 2 participants experienced game errors, but did not understand what they were doing wrong, but were able to correct the errors by trial-and-error (for example by placing an item in another spot). 4 of the participants started to get frustrated when using the editor, as they often had to swipe through all menus to locate items and objects. The participants were quickly able to save and test the level.

Usability issues observed

- 2 participants could not complete their tasks because they could locate the game settings.
- All participants spent a good amount of time looking for the specific items and object.
- All participants did not immediately know how to create a basic platform. 2 participants could not figure out how to create it even after trial and error.
- The participants often had to guess which category an item or object was placed under
- 3 participants had trouble operating the camera as the participants felt it was somewhat unresponsive
- 2 participants did not understand the error feedback given by the editor

Figure 10: Global menu. The participants thought some of the options were redundant, like character modification (upper left) and chat (bottom left).
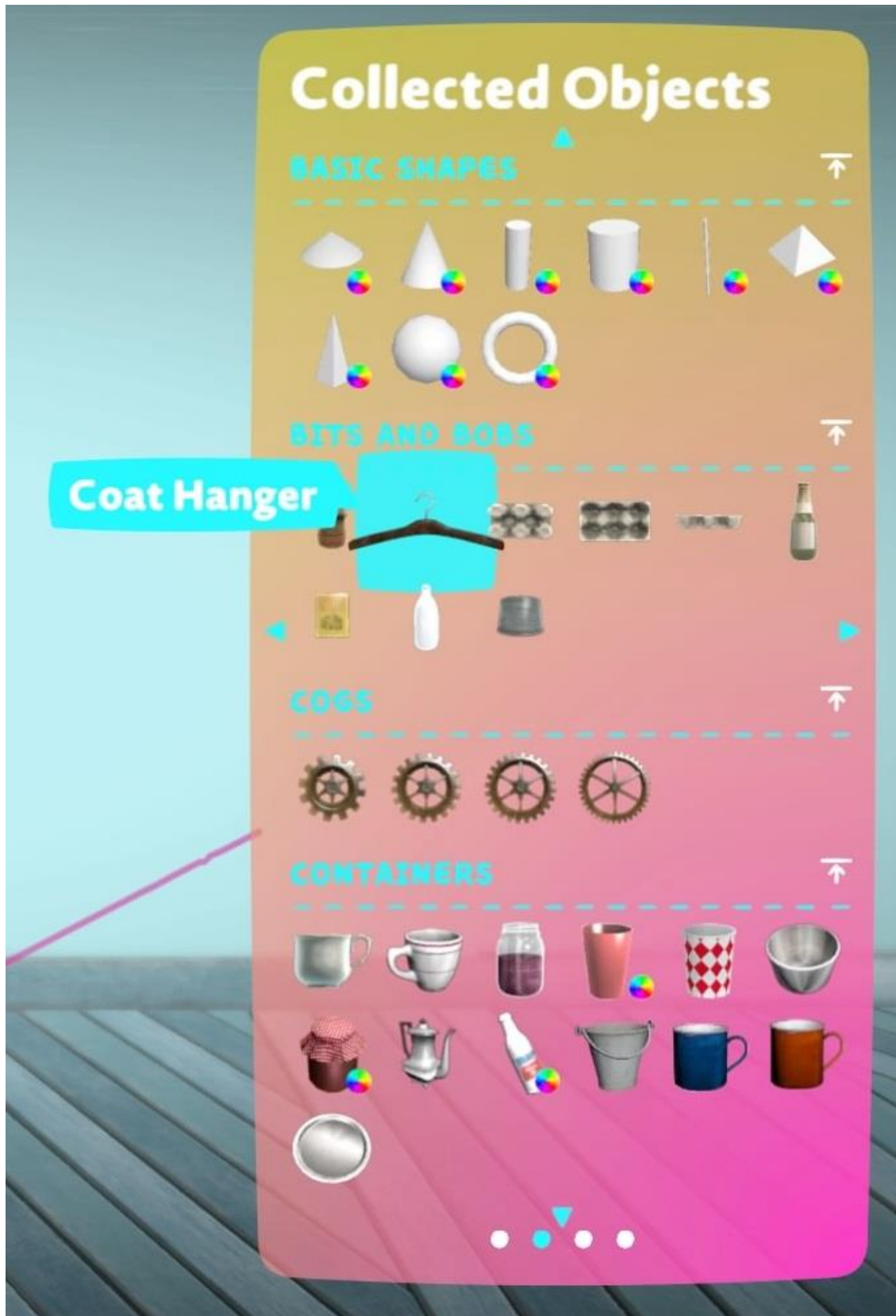
Figure 11: Object and items menu, where the user has scroll up, down, left and right to locate items. The participants felt the menu were flat and uncategorized.

4.2.4.4   Editor ratings

Table 2.D On a scale of 1 (easy) to 10 (hard), how easy/hard was it to use the editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	3
Participant 2	24	Core gamer	8
Participant 3	25	Casual gamer	6
Participant 4	26	Casual gamer	5
Participant 5	31	Core gamer	8

Table 3.D On a scale of 1 (bad) to 10 (good) how would you rate the <u>usability</u> of the game editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	7
Participant 2	24	Core gamer	5
Participant 3	25	Casual gamer	1
Participant 4	26	Casual gamer	3
Participant 5	31	Core gamer	3

Table 4.D On a scale of 1 (bad) to 10 (good), how would you rate the <u>game controls</u> of the game editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	6
Participant 2	24	Core gamer	7
Participant 3	25	Casual gamer	7
Participant 4	26	Casual gamer	8
Participant 5	31	Core gamer	5

Table 5.D On a scale of 1 (bad) to 10 (good), how would you rate the <u>categorizations</u> of menus and items?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	4
Participant 2	24	Core gamer	1
Participant 3	25	Casual gamer	3
Participant 4	26	Casual gamer	2
Participant 5	31	Core gamer	3

Table 6.D On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>playing the game</u>?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	9
Participant 2	24	Core gamer	7
Participant 3	25	Casual gamer	6
Participant 4	26	Casual gamer	10
Participant 5	31	Core gamer	7

Table 7.D On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>using the editor</u>?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	3
Participant 2	24	Core gamer	5
Participant 3	25	Casual gamer	6
Participant 4	26	Casual gamer	2
Participant 5	31	Core gamer	4

4.2.4.5 Interviews

Most participants encountered some problems when using the editor, and were not too happy with the editor overall, but pointed out that the complexity is a positive if the goal is to create complex levels. All participants felt the menu was unorganized and they did not like the flat menu structure, where they had to swipe through several menus. Two participants felt that there was some option in the game menus that could be removed (chat and character edit), as it only made the menu more confusing, and 2 participants felt that there could be less items and objects in the menus. 2 participants suggest a search function to make it easier to find specific items. 3 participants also suggest some example tutorials to perform basic actions.

4.2.5 TF:

4.2.5.1 Tasks:

The participants were asked to perform a total of 18 tasks of various complexity and difficulty (see Appendix C.4), one task at the time. Each participant had a time limit to complete each task. If the time limit was exceeded, the participants were asked to move onto the next task. The time limit it set so users should have sufficient time to complete the task, and not stay at the same task for a long period of time.

4.2.5.2 Task completion

Table 1.E Task completion

Participants	Age	Gamer type	Task completion
Participant 1	19	Hardcore gamer	17/18
Participant 2	24	Core gamer	17/18
Participant 3	25	Casual gamer	17/18
Participant 4	26	Casual gamer	17/18
Participant 5	31	Core gamer	17/18

None of the participants were able to complete task 16, which was to create a loop.

4.2.5.3 Observations

All participants were able to create a start and a finish quickly without problems. The participants spent most of the times looking for the right items in the categories, as they were not sure which subcategory an item would be under. Two of the participants often pointed out that they were not expecting some items to be placed under certain categories, for example "barbed wire" under the "city elements" category. All participants had major problems when trying to place an object or an item at the track, as they could not figure out the mechanics of the camera and game controls, and all participants were frustrated by this. Two participants experienced game errors, but were able to correct their errors accordingly by the game's feedback. All participants were complaining about the game controls and camera when working with the editor throughout the user testing, but all participants showed some progress and got more used to the camera at the end of the user testing, and were able to complete their task more quickly. All participants were quickly able to save and test the level. None of the participants

were able to create a loop, as they did not know which items, objects or game mechanics they should use. The participants also did not understand all the menu functions, as the game menu used terms and words which none of the participants were familiar with. There is a button which connects items to the race track, making the placement of objects and items quicker. However, only one of the participants were able to locate the button when using the editor. The other participants had to use extra time placing items at the race track. As loops are not part of the item inventory, the users had to combine different items to create a loop, but none of the participant were able to do so.

Usability issues observed

- All participants had major problem understanding the game controls and camera when working with the editor.
- All participants spent a good amount of time looking for the specific items and object, and two participants were often surprised by the category placement of some items.
- All participants had difficulties understanding all the functions in the game menu, mainly because of the unfamiliar words and terms.
- Only one participant was able to locate the item connection button, which connects items and objects to the race track.
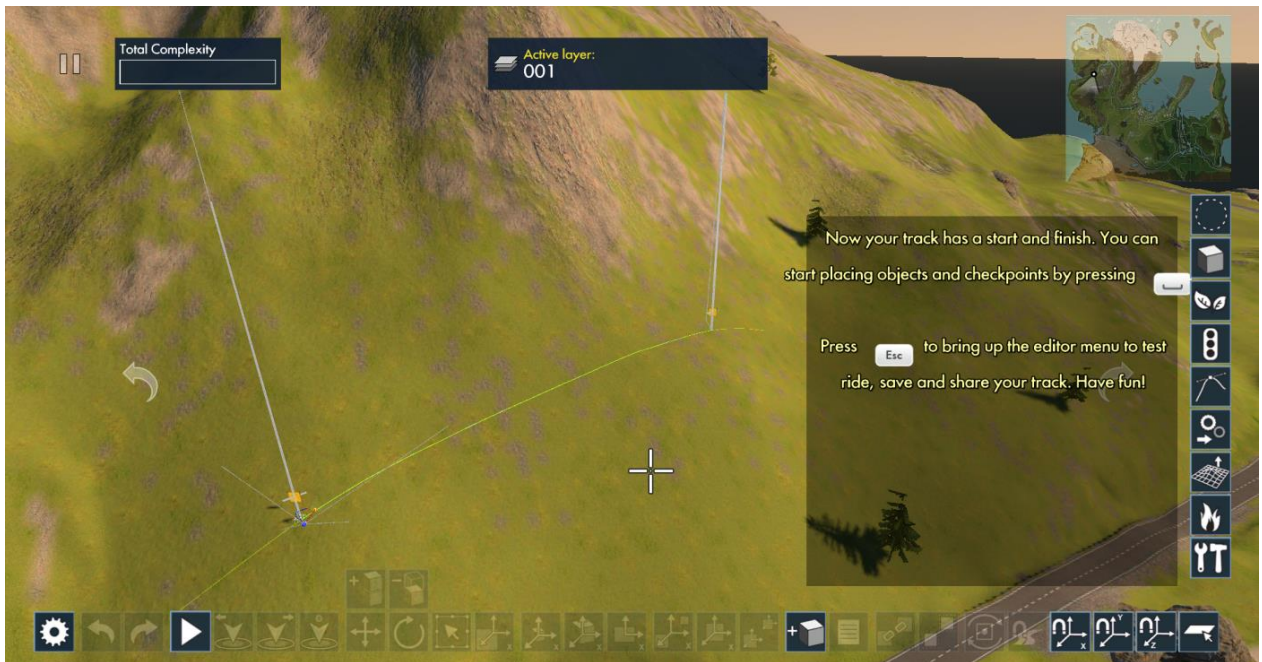
Figure 12: An overview of the user interface in the TF editor, with menus located at the bottom and right side. The editor also provided the user with game instructions, in this example after the user had created a start and a finish.

Figure 13: The item menu can be accessed by selecting "new object", which is the square box with the plus element seen in Figure 12.

4.2.5.4   Editor ratings

Table 2.E On a scale of 1 (easy) to 10 (hard), how easy/hard was it to use the editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	10
Participant 2	24	Core gamer	10
Participant 3	25	Casual gamer	5
Participant 4	26	Casual gamer	7
Participant 5	31	Core gamer	9

Table 3.E On a scale of 1 (bad) to 10 (good) how would you rate the <u>usability</u> of the game editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	3
Participant 2	24	Core gamer	2
Participant 3	25	Casual gamer	2
Participant 4	26	Casual gamer	1
Participant 5	31	Core gamer	6

Table 4.E On a scale of 1 (bad) to 10 (good), how would you rate the <u>game controls</u> of the game editor?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	4
Participant 2	24	Core gamer	2
Participant 3	25	Casual gamer	4
Participant 4	26	Casual gamer	1
Participant 5	31	Core gamer	3

Table 5.E On a scale of 1 (bad) to 10 (good), how would you rate the <u>categorizations</u> of menus and items?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	9
Participant 2	24	Core gamer	6
Participant 3	25	Casual gamer	5
Participant 4	26	Casual gamer	7
Participant 5	31	Core gamer	3

Table 6.E On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>playing the game</u>?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	5
Participant 2	24	Core gamer	7
Participant 3	25	Casual gamer	10
Participant 4	26	Casual gamer	4
Participant 5	31	Core gamer	7

Table 7.E On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>using the editor</u>?

Participants	Age	Gamer type	Rating
Participant 1	19	Hardcore gamer	1
Participant 2	24	Core gamer	3
Participant 3	25	Casual gamer	2
Participant 4	26	Casual gamer	1
Participant 5	31	Core gamer	4

4.2.5.5   Interviews

All participants pointed out that the game controls and camera were difficult to work with. 2 participants said that some of the items could be placed in other categories, but overall, all participants though the categorization of the objects were good, as it had a clear hierarchy. 2 participants thought it should be fewer options and items, as they didn't see the point of having that many items and objects which they would probably never use if they were making a level, and have fewer items to think about. It was also unclear to 4 of the participants what some of the menu functions were, and 2 participants pointed out that they just had to click on some of the menu options to see what functions they had. The participants were suggesting better tutorials, more explaining and in-game text, break up the tool menu in the bottom and user-friendly controls.

4.2.6 Cross-comparing the user test results

Table 1.F On a scale of 1 (easy) to 10 (hard), how easy/hard was it to use the editor?

Game	Average rating
GTA V	2,2
Portal 2	2
LBP 3	6
TF	8,2

Table 3.F On a scale of 1 (bad) to 10 (good) how would you rate the <u>usability</u> of the game editor?

Game	Average rating
GTA V	7,6
Portal 2	8
LBP 3	3,8
TF	2,8

Table 4.F On a scale of 1 (bad) to 10 (good), how would you rate the <u>game controls</u> of the game editor?

Game	Average rating
GTA V	9,2
Portal 2	9,4
LBP 3	6,6
TF	2,8

Table 5.F On a scale of 1 (bad) to 10 (good), how would you rate the <u>categorizations</u> of menus and items?

Game	Average rating
GTA V	9,2
Portal 2	9,4
LBP 3	2,6
TF	6

Table 6.F On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>playing the game</u>?

Game	Average rating
GTA V	9,2
Portal 2	9,6
LBP 3	7,8
TF	6,6

Table 7.F On a scale of 1 (boring/frustrating) to 10 (enjoyable/fun), how much did you enjoy <u>using the editor</u>?

Game	Average rating
GTA V	3,6
Portal 2	7,2
LBP 3	4
TF	2,2

4.2.7 Summary

Based on the ratings, observations and interviews, the Portal 2 editor and the GTA V editor is the easiest editors to use amongst the participants. They had significantly higher scores, and the participants were most happy with these editors. All editors were however challenging to a certain extend for several of the respondents, particularly when trying to locate items/objects, and completing more challenging tasks. The justification for the participants' ratings for the Portal 2 and GTA V editor were mostly because of the easy-to-use controls, easy to operate the game camera, and the user interface was easy to understand and navigate through. However, the participants felt the GTA V editor were boring to use and would not use it again. The participants felt the LBP 3 editor was hard to get into, and did not like the categorization and navigation menu. In the TF editor, all participants struggled with the camera controls and placements of items. Portal 2 were the most enjoyable game and editor – and two respondents said they would like to buy the game and try the editor in the future.

4.3 Cross comparing the survey results and the user test results

When comparing the difficulty of the editors (easy (1) or hard (10) to use), the survey ratings have a margin of 1.23 from the lowest rated to the highest rated. The survey ratings were 4.49 for the Portal 2 editor, and between 5.27 to 5.72 for the other three editors. The user test ratings are more diverse; 2 (Portal 2), 2,2 (GTA V) 6 (LBP 3) and 8,2 (TF). However, all the participants were inexperienced users, while the survey respondents are probably more experienced users, as the majority of the respondents who had used the editor, had completed and shared several levels. When comparing the user test results to the respondents which are more likely to be more inexperienced users (respondents who had not completed a level), the results are more diverse; 4.83 (Portal 2), 5.79 (GTA V), 6.50 (LBP 3) and 6.18 (TF). These results are somewhat closer to the user test results.

5 Discussion

5.1 The surveys

5.1.1 Editor participation

The two games which rely most on UGC, TF and LBP 3, have the highest editor participation amongst the respondents – 76% for TF and 90% for LBP 3. The respondents are also more likely to have completed and shared several levels within these two games. It may indicate that these games attract different types of players, even though TF players value the competitive aspect more than the creative aspect, and the LBP 3 respondents and the Portal 2 respondents are equal about their valuation of the creative aspect (89%). The TF and LBP 3 respondents have spent a significantly more amount of time in the editor, compared to Portal 2 and GTA V players. Portal 2 and GTA V does not emphasize that much on UGC, which can explain why the respondents have spent less time in these editors compared to TF and LBP, and why Valve (Portal 2) and Rockstar (GTA V) released the editor tool a year after the initial release of the game.

The survey results revealed that the game editor participation culture is not significantly higher amongst younger age groups (except for Portal 2), which does not correlate to Comunello & Mulargias' conclusion from the 2009 study where 50% of the respondents who had created and shared a level were 19 years old or younger. The four games are mostly played by younger players, but compared to other age groups; they are not more likely to use the editor or find the editor easier to use.

The respondents who do not use the editor usually find the editors boring and would rather just play content generated from other users. As mentioned in Chapter 2.9.1, it is a challenge for game studios to create an editor which is targeted to a broad user group, so it is likely that the game editor will not be used by all types of players. Rockstar and Valve may be satisfied to have about 15% active content creators, so it all depends on the users' and developers' goals

(Lightbown 2015). The survey also revealed that most respondents do not consider UGC to be a conclusive factor when playing/buying a game.

5.1.2 Ratings

Based on the survey ratings from 1 (easy) to 10 (hard), the Portal 2 editor is significantly easier to use (4.49) compared to the other three editors (ranging from 5.27 to 5.72). It makes sense, as Valve has already stated that tutorials are not necessary for learning the editor, and the editor is targeted towards not only Portal 2 players, but tutors and teachers as well, so creating a tool that is easy to use are likely to be a top priority.

5.1.2.1 Age groups

There are no particular age groups who find the editor easier to use, as there are significant differences within each editor. LBP 3 respondents in the 0-19 age group find the editor easier to use compared to other age groups, but the GTA V respondents in the 0-19 age group finds the editor hard to use compared to other age groups. According to the survey results, younger players are more likely to see themselves as core and hardcore players compared to older age groups, but either game types or age seems to affect the ratings when cross comparing.

5.1.2.2 Gamer types

There are no indications that certain player types find the editors easier to use than other player types. However, the casual player ratings are more differentiated compared to the ratings by core and hardcore players. Casual TF and Portal 2 players have a lower average compared core and hardcore players, while casual GTA V and LB3 players have a higher average compared to core and hardcore players. It may indicate that there are significant differences between the player bases within each game. Nonetheless, gaming experience does not seem to have an impact on the perceived editor difficulty.

5.1.2.3 PC vs. console

Portal 2, GTA V and TF are cross-platform games, which mean that they are released on several gaming platforms. LBP 3 is a PlayStation exclusive title, and has only been released on PlayStation. Game controls for console are limited to two $360°$ joysticks and 16 buttons (for Xbox and PlayStation), which may limit the user options and add certain constraints, compared to a mouse and keyboard for PC. However, console users do not find the editor harder to use, even if they would have more control limitations compared to computer users. TF, which is dominated by console users, are rated easier to use amongst console users (5.65) compared to

computer users (5.77). For some players, control limitations and constraints could simplify the editor, making it easier to use as the users do not have to worry about hotkeys or all the editor functions on a keyboard.

5.1.2.4 Aspects

When asked why the respondents have not used the editor, most respondents answered that they do not see themselves as creative enough to come up with good ideas for a level. Bosch, Looy & Ribbens study (2011) concluded that players are less likely to use the editor if they could not create new content which was valuable to the game. Creating a level is not just about understanding how an editor works, but also about using cognitive skills such as imagination and creativity to produce a level. For many players, being able to create is often what draws players to a game, either to games with editors or sandbox games. However, those who do not value the creative aspect in particular find the editor easier to use than for those who do. The only exception is the TF players, where those who value the creative aspect find the editor easier to use than for those who do not. Even if those respondents who do not value the creative aspect find the editor easier to use, the respondents who value the creative aspect are significantly more likely to use the editor – which is comparable to Bosch, Looy & Ribbens' findings.

5.1.3 Level completion

The majority of the respondents who have used the editor have created and shared several levels. LBP 3 and TF players are significantly more likely to have created and shared several levels, which are the two games that rely most on UGC. The results are significantly different compared to Comunello & Malargias study (2009), where 21% of the respondents had completed and published at least one level in LBP.

Players who have created and shared several levels find the editor easier to use compared to those who have not completed, completed but not shared, or completed and shared one level. Those who have created and shared several levels are more likely to be experts, and could have an easier time using the editor. As most respondents have completed at least one level, the minority have not completed a level (6-24%). Statistically, if a player is trying out the editor, the player is much more likely to complete a level than to give up or abandon the editor, based on the survey results. This result has similarities to Bosch, Looy & Ribbens (2011) findings, where 70% of the respondents who have used an editor have completed at least one level.

5.1.4 Distribution curve

The majority of the results lack a distribution curve, as most ratings are diversified (see Appendix B). For example, in GTA V, the players who had completed and shared several levels mostly rated the editor a 4 and 8. This is a continuous tendency through the survey result, where the results often are divided into two blocks, one ranging from 2-4 and one ranging from 6-8, with no or few extremes (1 or 10), and few ratings in-between. This tendency has no significant statistic correlation to other factors such as age, gamer type or gaming platform or time spent using the editor.

Figure 14: The player ratings does not follow a normal distribution curve (red line).

5.1.5 Summary

The TF and LBP 3 editor has a higher editor participation percentage, so it may indicate that these users are core users and enthusiasts and are more invested in the game and in the editor, especially given that the majority of the TF and LBP 3 respondents have completed and shared several levels.

Based on the survey results, the Portal 2 editor is the easiest editor to use compared to the other editors. The Portal 2 editor is made for both players and non-players, and with developers emphasizing on learnability, the result is an editor which are more likely to be easier-to-use than other editors. The TF and GTA V editor has almost the same rating, while the LBP 3 editor has a slightly lower rating, but has a closer margin to each other compared to the Portal 2 editor.

When cross comparing the editors, there are no particular user groups who finds the editor easier to use than others. There are some significant differences within each editor, which may indicate that it is editor dependent. Nonetheless, the ratings are usually only differentiated by a

small margin – and given the low volume of some of the response options – it could be likely that these results are arbitrary.

5.2 Usability testing

In general, the participants found the GTA V and Portal 2 editor the easiest editor to use based on the observations, users' feedback and ratings. They felt the LBP 3 editor was complex and somewhat overwhelming because of all the menus and options. The participants did not like the TF editor because of the game controls, which according to the participants, had several usability issues. 4 of the 5 participants felt the Portal 2 editor was the easiest to use, based on the user ratings. The participants were complementing the Portal 2 editor for being particularly user friendly and intuitive, and enjoyed using this editor more than any editor. However, the participants would like more and better game instructions or simple tutorials to understand the editors better, as some were not happy with the existing tutorials. All participants showed some progress during the usability testing, and got accustomed to the tools. Overall, there were no significant differences between the participants, but participant 1 (19 years old hardcore gamer) were able to complete the most tasks and were overall moderately quicker when completing tasks compared to the other participants. Most participants struggled with the tasks in the LBP 3 editor, as they were not able to perform certain actions or locate specific options – mainly because they didn't feel the tutorials was sufficient enough to get started. None of the participants were able to create a loop in the TF editor, as they had to create the loop by using several items to create a loop. The TF tutorials did not display how to create a loop, even though a loop is a common game element.

5.2.1 Game controls

Using a game controller instead of a mouse and a keyboard could simplify the game controllers, or make it demanding, as the player have access to a limited number of buttons. However, all 5 participants said they preferred using mouse and keyboard when using a game editor. When asked to compare editors on PC and gaming console, the participants felt that using mouse and keyboard were more precise, as the participants were able to perform task more quickly. When using the console editors, the participants often had to scroll through a set of items to reach a specific object or an item, but on the computer, participants were able to just move the mouse over to an item or object in a quicker and more accessible way. This result is a contrast to the surveys, where console users found the editors easier to use compared to computer users.

All participants where particularly troubled by the controls in the TF editor. The participants tried to place items along the race track, but ended up with placing items floating in the air because of the incomprehensive camera control, and struggled to link the items to the track. The participants spent a significantly amount of time trying to place items and objects in at the correct location, compared to the other editors. 3 participants felt the controls were slow and unresponsive, making the editor more difficult to work with.

5.2.2 Constraint

Constraint is setting limitations to what a user can do with the editor, reducing the user's mental workload by making clear what can and cannot be done. All the games have some constraints which limits the user actions to a certain degree, for example by game world boundaries. Some participants said in the interviews that they did now know if the grey buttons in the TF menu are supposed to be clicked or not, which shows a lack for clear limitations. By making clickable icons more distinctive, users are more likely to know the editor constraints.

5.2.3 Natural mapping and representation

The participants mostly performed actions which matched with the participants' expectation, for example by placing items with the left mouse button, or pressing "options" on the game control to access the main menu. For example; when using the GTA V editor, all participants immediately understood which specific buttons they had to use to rotate an item, even if the game did not illustrate how to do it. However, when using the TF editor, the participants often misplaced items on the game map because of the controls and camera angles which did not match the participants' expectations as to where the items would be placed. When errors occurred in the GTA V editor, the participants immediately recognized the error because of the traditional warning sign used as visual feedback for errors.

5.2.4 User feedback and feed forward

The participants were for the most part able to understand the editor's feedback. The participants were most satisfied with the feedback in the GTA V editor, as this editor gave users several instructions as to what actions they need to perform (Figure 15), and actions they had performed. Some participants felt that the LBP 3 editor could give more user feedback, for example sufficient error feedback, and more game instructions when using the editor.
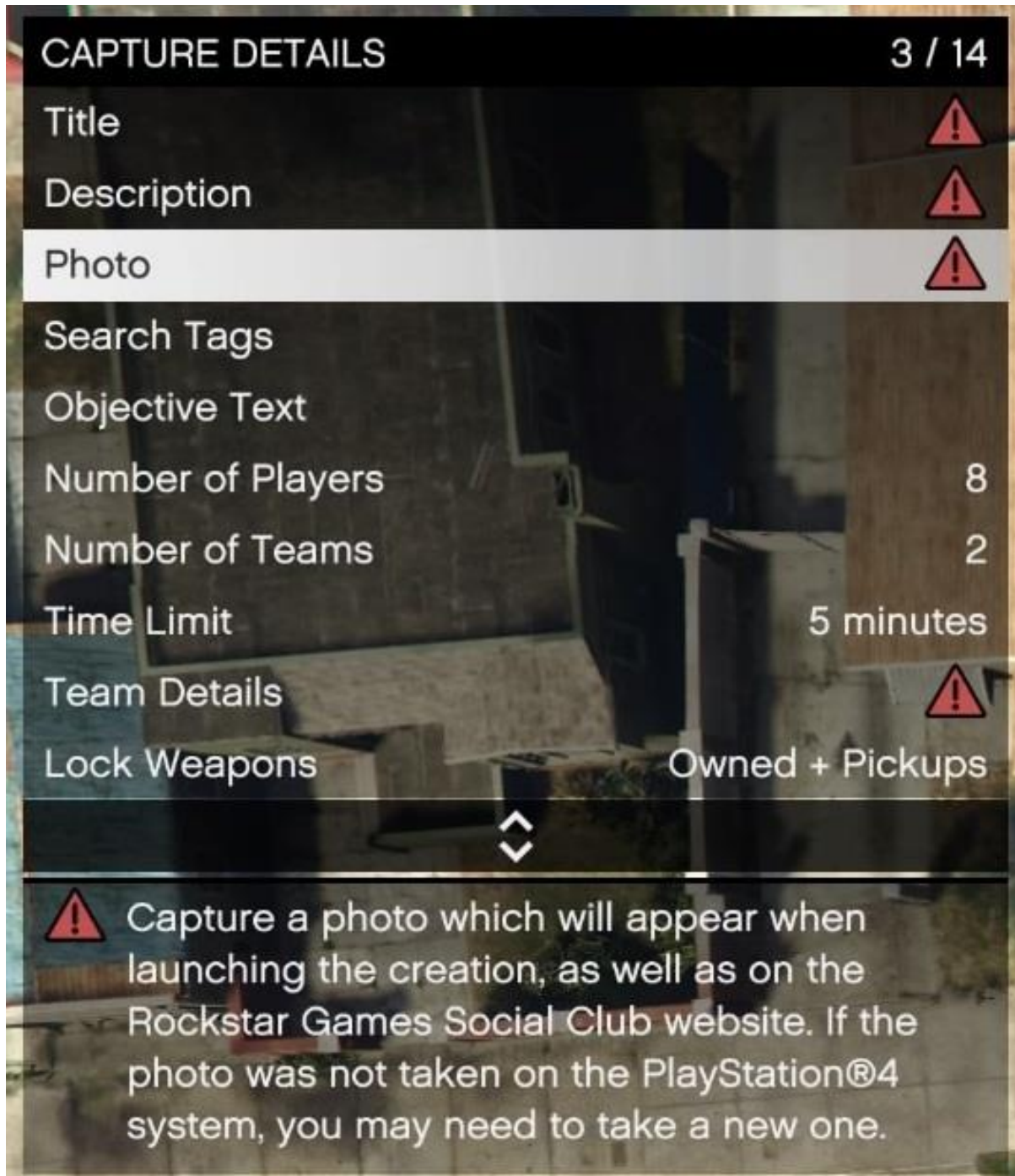
Figure 15: Errors are marked as a traditional warning sign, and the participants were able to correct the errors based on the game's feedback instructions.

All 5 participants experienced errors when using the editor, and in the GTA V and the TF editor they were quickly able to recover from the errors. It was more unclear that an error had ensued in the Portal 2 and the LBP 3 editor. When an error occurs in LBP, for example by trying to place an item which cannot be placed at a certain spot, the user will only hear a cartoon-like

sound. Some participants did not immediately identify this sound as an error, and they did not know why the sound transpired.

The TF editor were displaying game errors through visual feedback, and the participants were immediately able to correct their mistakes accordingly by the instructions that was given (Figure 16).

Figure 16: The player gets a clear visual feedback in the center of the screen if an error occurs in TF

The Portal 2 editor displays an error as a red marking around the object with "cursing" gestures from the object as seen in Figure 17. 2 participants did not immediately understand that the editor was displaying an error. They were however able to correct the errors – even if the game did not tell the user why the error occurred, or how to correct it.
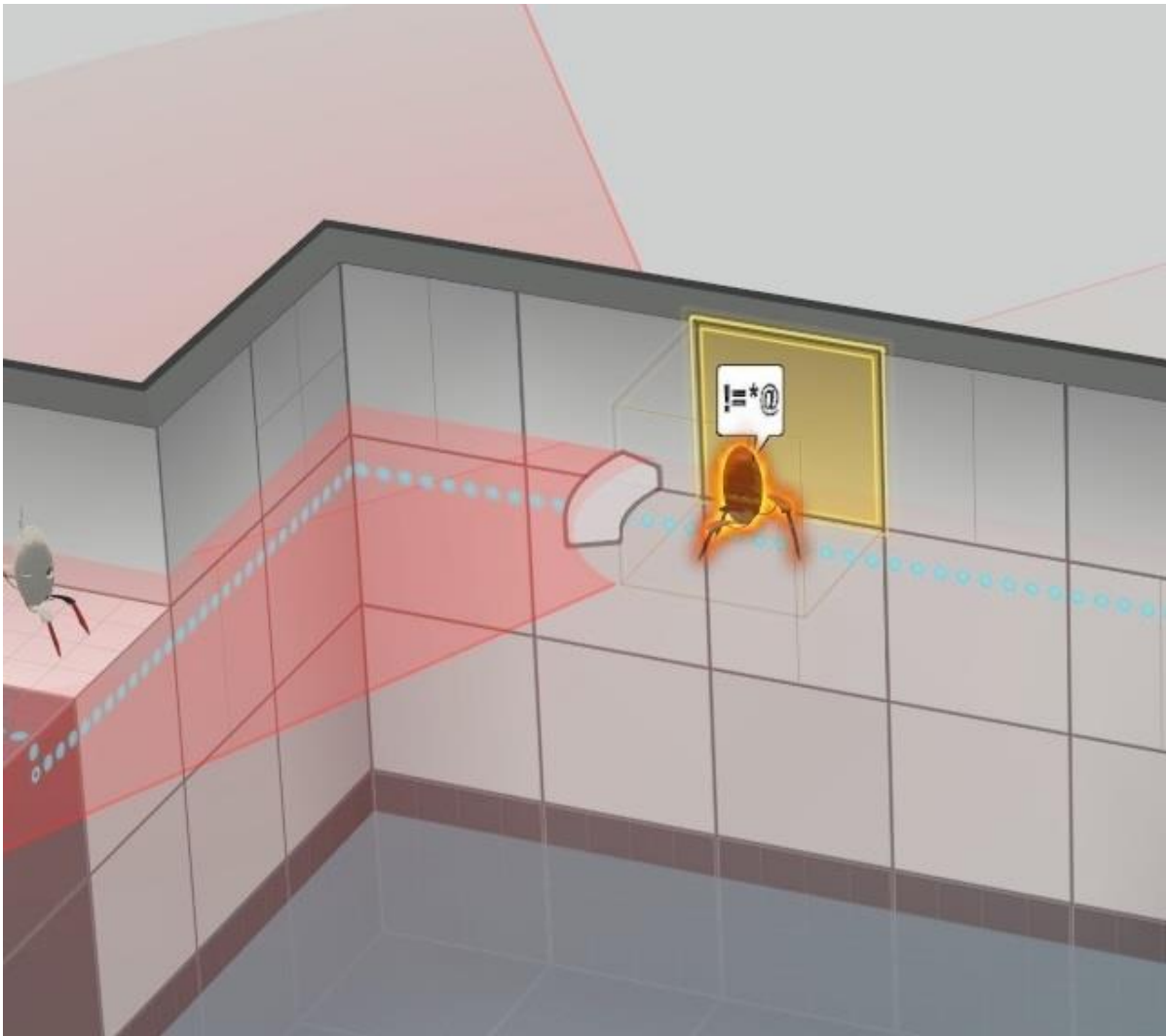
Figure 17: The participant had placed an object in the air, which caused a game error. The visual error display is the red-orange marking around the object, as well as the cartoon-like cursing.

GTA V were the only editor with both visual and audible error feedback, and the participants did immediately know an error had occurred, and were able to correct it accordingly to the games feedback instructions (Figure 18).
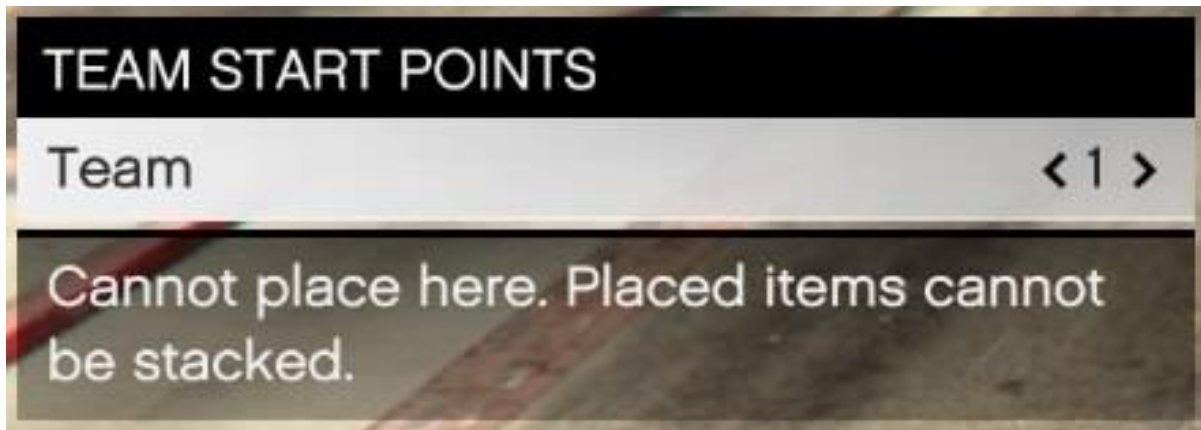
Figure 18: Error message appeared in the upper left corner of the screen, and all the participants who experienced an error were able to correct it accordingly to the message that were given.

By using only audible feedback in the LBP 3 editors, the participants were not able to correct their mistakes, as it was not clear to what made the game signal for an error. This caused some frustration with two of the participants who experienced error a few times during the tasks. Having only audible feedback could also make it hard for players with reduced hearing to receive feedback, as they will get no visual information if an error has occurred. However, none of the participants had impaired hearing and were able to read the audible feedback.

All participants experienced errors in all games, which means that the editor did not provide sufficient feed forward before the participants performed actions which lead to the errors. The Portal 2 editor did nonetheless use feed forward to highlight which areas that will be selected if the user left click to perform an action, and the participants were able to calculate their actions based on the feed forward. The LBP 3 editor also used feed forward to indicate the platform depth when creating a platform, and the participants could calculate the correct depth before creating a platform.

5.2.5 Progressive disclosure

Most participants were overwhelmed by the options, menus and items in the LBP 3 editor, and to some extent in the TF editor. The participants were complaining about number of disorganized menus, difficulties locating items and some redundant menus and categories. Several participants mentioned in the interview that they would prefer to customize the editor for their own needs, which is the concept of progressive disclosure. Simplifying an editor can

improve learning, and the users can progress by customizing the editor to suit their needs as they move from beginners to experts.

In the Portal 2 editor, the participants spent very little time looking for the right items, as they only had one menu to focus on. The Portal 2 editor has significantly less items and objects compared to the other editors which where the preferred editor. Portal 2 (for computer users) also has a more complex editor – the *Source Hammer Editor* mentioned in Chapter 2.2.3 – which is designed to suit the needs for expert creators.

5.2.6 Grouping and categorization

Information architecture is important to sort out content in a way which makes sense to the user, as well as making it easier for users to memorize and being quickly able to locate content without excessive thinking.

Nonetheless, the participants had trouble location items and functions in the LBP 3 editor, and spent most of the time looking through the sub categories to figure out where the items were. All the participants also had trouble finding some of the items in the TF editor as some of the categorized content did not make sense to the participants. For example, all five participants spent longer time looking for "barbed wire" than other items, as they did not expect it to find it under the "city elements" category. One participant commented "why is this item grouped under "city elements", it makes no sense". This is a strong indication that the participant did not associate barbed wire as a city element. 4 participants also had trouble locating some of the items in the GTA V editor, and spent most of the time looking for the right categories and right items.

4 participants felt the items in LBP 3 where uncategorized and seemingly just placed in random orders, and they were calling for a more structured grouping of items and menus to make the editor more user friendly.

5.2.7 Iterative testing

Being able to do iterative testing of a level is important when working on an editor, as creators would usually like to test what they create. All participants were able to save and test all editors in quick way through the game menus, as these options are located in the general menus and are easy accessible for the users.

5.2.8 Mental model and conceptual model

Lightbown (2015) describes the importance of using metal models when designing editor tools, which can help improving the user experience - for example with use of words and categories which make sense to the users. The easiest editors have a mental model that is close the conceptual model. For example; the Portal 2 editor uses traditional interface elements from Windows, which is well known to most users. Familiarities such as a Windows interface requires effort and less cognitive load, compared to an unfamiliar interface where users have to learn the design and its functions. Most users are familiar with the Windows layout, so they do not have to learn how the menu works; all participants were quickly able to use the menu function without excessive thinking – one participant even commented that it was very similar to a Windows program (Figure 19). In the TF editor however, the participants were not able to understand some of the menu functions, because of the difficult terminology used by the editor (Figure 20). If the editor had used words and terminologies which were familiar to the user, the users would more likely be able to quickly recognize the editor function – exemplified by the Portal 2 editor.
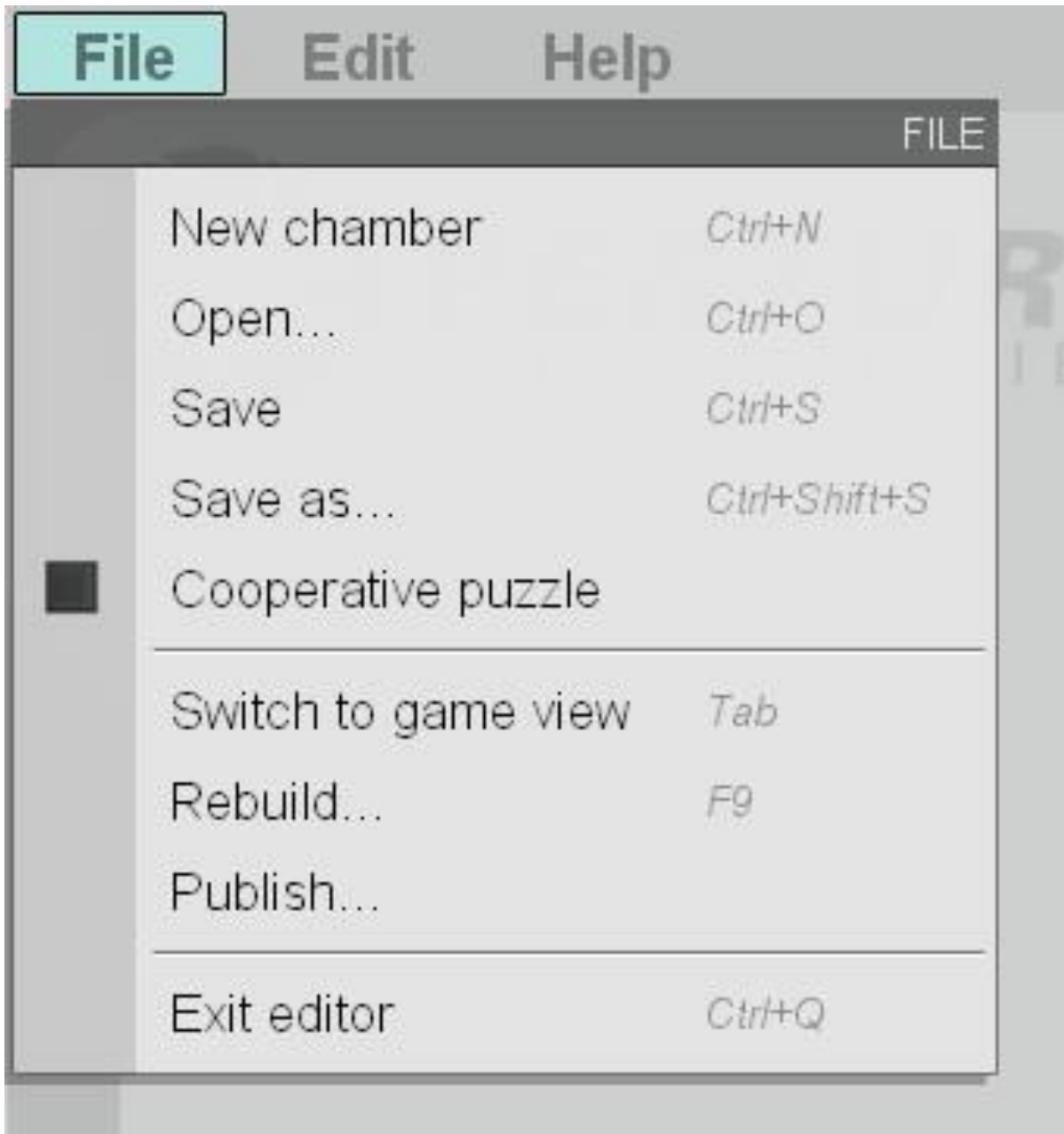
Figure 19: The participants immediately knew where to save the map, mainly because of the similar layout to a Windows program (also exemplified by the hot keys).

Figure 20: Two of the participants were not sure what the function of this option was, because of the difficult terminology.

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5.3 Summary and suggestions

The editors are very different in terms of complexity and learnability. The most complex editor, LBP 3, has the most items, game options and game functions. The LBP 3 editor is therefore more likely to have a steeper learning curve, where the focus is less on learnability, but developed for efficiency. The menu structure in LBP 3 is flat, thus requiring knowledge about the menu and where to look locate specific items. If not, the user will spend time by navigating and searching to find items like the participants were experiencing. A more structured and hierarchical menu could make the menu less efficient for expert users, as they will spend more time navigating through several levels to locate items. The TF editor has a great number of items and objects as well, but these are placed in a hierarchical order. However, it may take longer time to navigate to find the right item, even if the user knows where to locate the specific items. The Portal 2 editor had only one menu, and did not require any knowledge to the interface structure or the hierarchical placement of items and objects.

Providing sufficient error feedback is essential for users to correct their mistakes. Having both visual and audible feedback like the GTA V editor made it very clear to the participants that an error had occurred. The participants were quickly able to resume by reading the feedback guidance. When an error occurred in LBP 3 because of item misplacement, the participants did not immediately understand the error feedback, and they were not able to correct their mistake based on the editor's feedback. Instead, they had an experimental approach where they would try the same action continually until they were able to place an item.

It's a fine balance by creating an editor which is easy to use, without an editor which is boring to use. Even if the Portal 2 and the GTA V 2 editors did generate a low score, all participants preferred this editor over the GTA V editor. However, 3 participants did not enjoy using the GTA V editor because they felt it was boring to use – but this does not correlate to the survey as the GTA V editor had higher editor participation compared to the Portal 2 editor.

Focusing on learnability rather than efficiency may attract a different player type, as the user testing revealed that the participants preferred the Portal 2 and GTA V editor over the other editors. With its simple design, the Portal 2 editor shows that there is a very high participation of creators, as over 571 000 levels have been created, even if the survey results revealed that fewer respondents had completed and published several levels compared to other editors. Portal

2 is a more popular game than LBP 3 based on sold copies, so the Portal 2 player base could be more diverse compared to LBP 3.

The observations revealed that the participants had trouble finding items in all games except Portal 2, because the item grouping often did not match the user's mental model as they were often looking in the wrong categories. For creating a logic grouping and categorization structure, Lightbown (2015) suggest using card sorting as a method to find out in which categories different objects and items should be placed. The participants in the user tests would most likely place some of the items in other categories. For example; when trying to change the background in LBP, 3 of the 5 users expected the option to be under the "decoration" category – which make sense because the background is nothing more than a game decoration (changing the background has no effect on the actual gameplay). Two of the users would also like a better sorting of the menus in the TF editor, and three participants suggest using a better structured menu in the LBP 3 editor.

5.4 Limitations and further research

Some of the survey results – like the average editor ratings – are heavily influenced by the number of respondents. Several survey options were selected by only a few respondents, which makes the average rating very dependent on what these few respondents were answering. This makes it hard to draw conclusions based on just a limited number of respondents, and increases the chance that the results are arbitrary.

This study can be viewed as a cross comparison between enthusiasts who reads or take part game related gaming communities. The survey results in this research are not representative of the player base within each game. There are to our knowledge no player data available, which means there is not possible to cross compare the results to see the variation between the players participating in the survey and other players. The surveys were distributed through different communities, so the data can therefore be viewed a representation of the community, and not the game itself. Players who take part in communities are perhaps more devoted than players who play only once in a while, and have no interest to participate in active game communities. A representative game survey can be conducted if the survey is distributed to all players who play or own the game, for example through random sampling based on the entire player database. Some of the results in the surveys are significantly different to previous studies – like Comunello & Marlargia's 2009 study – which is another indication that there are great variations depending on which players who are participating in the surveys. Some of the studies reviewed in Chapter 2 are old, so the player base could have changed since then.

The respondent demographics are unknown, and language barriers may well be a factor which causes a player to struggle with the editor. The games have language support for the most common languages only such as English, Spanish, Portuguese, French, Dutch and Chinese. The surveys were however distributed through international English game forums, so it is likely that most respondents at least understand English.

It is not given that some editors are easier than others, as "easy" and "hard" are relative words, meaning that the respondents could have different interpretations of what makes an editor easy or hard to use. The results have often no normal distribution curve, but usually two sets of blocks in the 2-3 area and 7-8 area, which could indicate that the respondents have different interpretations of what makes an editor hard or easy – especially since this tendency has no

correlation to other statistics. The respondents may also rate the editor based on certain editor aspects such as usability, game controls, learnability or editor complexity. Editors designed for efficiency could also be perceived as difficult editors compared to editors which is designed with learnability in mind.

All participants in the user tests were being observed in a controlled environment, which may have an effect on the test results. The Hawthorne effect (Monahan & Fisher 2010) is how a person change behavior as a response to being observed, usually through extra exertion. The results could therefore be artificial compared to users in a natural setting.

5.4.1 Learnability

Further research on this topic should study a user's learning curve when using a game editor. For example, by measuring how well a user understands the editor after certain periods spent using the editor, through metrics to measure a user's progress or knowledge of the editor.

5.4.2 Efficiency

As mentioned in Chapter 2, an editor can seldom be both efficient and have a high learnability, as efficiency often comes at the expense of learnability, and vice versa. By measuring efficiency, we can perhaps get a deeper understanding of what kind of tool experienced users prefer, and measure efficiency within tools that supposedly have been focusing on learnability (such as the Portal 2 editor). Cross-comparisons can be made to see what makes a tool efficient, for example by comparing a less complex editor like the Portal 2 editor with the more complex LBP 3 editor. Lightbown (2015) explains in his book how efficiency can be measured using the same guidelines and principles from chapter 3.

6 Conclusion

When looking at the editors in light of the research questions, we see that some editors are easier to use than others if the user have no prior experiences with game editors. The Portal 2 editor is designed for beginners; it uses constraints to make the editor less complex and thus focusing on learnability, where the more complex LBP 3 editor has more options and more flexibility, but a steeper learning curve. However, the LPB 3 editor was rated easier to use than both the GTA V editor and the TF editor amongst survey respondents, which may indicate that some core users prefer efficiency over learnability, because the user test participants found this editor significantly harder to use than the Portal 2 and GTA V editor. All participants who were beginners preffered the GTA V and Portal 2 editors. The majority of the LBP 3 and the TF survey respondents had spent a good number of hours in the editor, which may indicate that most of these respondents were core users and enthusiasts. The Portal 2 and GTA V respondents had generally less hours spent in the editor. 61% and 54% of those who had used the editor in the LBP 3 and TF editor had completed and shared several levels, compared to 27% and 35% in the Portal 2 and GTA V editor, which may either reflect the nature of the survey respondents, or the player base in these games.

Even if the user testing revealed that the GTA V and Portal 2 editor where the two easiest editors to use, they still have a significantly lower participation than TF and LBP 3, based on the surveys. This may be another indication that the TF and LBP 3 editors are designed for efficiency, and not learnability. Lightbown (2015) explains that it is hard to combine both efficiency and learnability in an editor, so game developers may need to choose define the editor goals, and the editors target group. Both Portal 2 and GTA V are two mainstream games, so it makes sense to focus on learnability rather than efficiency, as efficiency may be more suited for experienced and core editor users. The LBP 3 and TF editor is the most complex editor, but have the highest percentage of respondents who take part in creating and sharing levels. These games are perhaps more targeted towards players who have an interest in UGC, as the TF survey

results revealed that UGC is a compelling factor for the respondents when buying or playing a game.

However, there are still room for improvement which can increase both learnability and efficiency of an editor, without conflict the needs of beginners and core users. Providing visual and audible feedback is important for the communication between the game system and the user, as the users will spend less time thinking, and more time performing actions. Card sorting can be used to create a structure which matches the users mental model, and thus making the editor more efficient and ease the users cognitive load. More and better game instructions and tutorials can help players advance more quickly from beginners to experts, and using progressive disclosure can be beneficial to help the players with a steady progress from beginners to intermediates and experts.

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A Survey questions

A.1 GTA V

I am a:

- Male
- Female

How old are you?

- 0-19
- 20-25
- 26-30
- 31-40
- 41-55
- 56+

I play GTA on

- PC
- Xbox One
- Xbox 360
- PlayStation 4
- PlayStation 3

What aspects are important to you when playing a game

- The competitive aspect
- The creative aspect
- The social aspect

I see myself as a

- Casual gamer
- Core gamer
- Hardcore gamer

User-generated content is a crucial factor for me when buy/playing a game

- Strongly disagree

- Disagree

- Neutral

- Agree

- Strongly agree

Have you used the level editor in GTA V before? (GTA creator)

- Yes

- No

If the respondent <u>have not used</u> the level editor

What is the reason you do not use the level editor? (you may choose more than one answer)

- The level editor is hard to use

- I find level creation boring/timeconsuming

- I do not see my self as creative enough to come up with good ideas for a level

- I prefer to just play content generated from other users

- I have just started playing the game, but I would like to try it in the future

- Other (*textfield*)

Do you engage in level creation/mod creation in other games)

- Yes

- No

If the respondent <u>have used</u> the level editor

Have you completed and published/shared a level?

- Yes

- Yes, I have completed and shared several levels

- Yes, I have completed a level, but not shared with anyone

- No

On a scale of 1 (easy) to 10 (hard), how easy/hard was/is it to use the editor?

How many hours have you spent playing the game? (roughly estimated)

How many hours have you spent playing creating levels in the game? (roughly estimated)

Do you engage in level creation/mod creation in other games?

- Yes
- No

A.2 Portal 2

I am a:

- Male
- Female

How old are you?

- 0-19
- 20-25
- 26-30
- 31-40
- 41-55
- 56+

I play Portal 2 on

- PC
- Xbox 360
- PlayStation 3

What aspects are important to you when playing a game

- The competitive aspect
- The creative aspect
- The social aspect

I see myself as a

- Casual gamer
- Core gamer
- Hardcore gamer

User-generated content is a crucial factor for me when buy/playing a game

- Strongly disagree
- Disagree
- Neutral
- Agree

- Strongly agree

Have you used the level editor in Portal 2 before?

- Yes
- No

If the respondent <u>have not used</u> the level editor

What is the reason you do not use the level editor? (you may choose more than one answer)

- The level editor is hard to use
- I find level creation boring/timeconsuming
- I do not see my self as creative enough to come up with good ideas for a level
- I prefer to just play content generated from other users
- I have just started playing the game, but I would like to try it in the future
- Other (*textfield*)

Do you engage in level creation/mod creation in other games)

- Yes
- No

If the respondent <u>have used</u> the level editor

Have you completed and published/shared a level?

- Yes
- Yes, I have completed and shared several levels
- Yes, I have completed a level, but not shared with anyone
- No

On a scale of 1 (easy) to 10 (hard), how easy/hard was/is it to use the editor?

How many hours have you spent playing the game? (roughly estimated)

How many hours have you spent playing creating levels in the game? (roughly estimated)

Do you engage in level creation/mod creation in other games?

- Yes
- No

A.3 LittleBigPlanet 3

I am a:

- Male
- Female

How old are you?

- 0-19
- 20-25
- 26-30
- 31-40
- 41-55
- 56+

What aspects are important to you when playing a game

- The competitive aspect
- The creative aspect
- The social aspect

I see myself as a

- Casual gamer
- Core gamer
- Hardcore gamer

User-generated content is a crucial factor for me when buy/playing a game

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Have you used the level editor in LBP 3 before?

- Yes
- No

If the respondent <u>have not used</u> the level editor

What is the reason you do not use the level editor? (you may choose more than one answer)

- The level editor is hard to use

- I find level creation boring/timeconsuming

- I do not see my self as creative enough to come up with good ideas for a level

- I prefer to just play content generated from other users

- I have just started playing the game, but I would like to try it in the future

- Other (*textfield*)

Do you engage in level creation/mod creation in other games)

- Yes

- No

If the respondent <u>have used</u> the level editor

Have you completed and published/shared a level?

- Yes

- Yes, I have completed and shared several levels

- Yes, I have completed a level, but not shared with anyone

- No

On a scale of 1 (easy) to 10 (hard), how easy/hard was/is it to use the editor?

Have you enabled the 'Advanced Creation Mode'?

- Yes

- No

- I did not know this was an option

How many hours have you spent playing the game? (roughly estimated)

How many hours have you spent playing creating levels in the game? (roughly estimated)

Do you engage in level creation/mod creation in other games?

- Yes

- No

A.4 Trials Fusion

I am a:

- Male
- Female

How old are you?

- 0-19
- 20-25
- 26-30
- 31-40
- 41-55
- 56+

I play Trials Fusion on

- PC
- Xbox 360
- Xbox One
- PlayStation 4

What aspects are important to you when playing a game

- The competitive aspect
- The creative aspect
- The social aspect

I see myself as a

- Casual gamer
- Core gamer
- Hardcore gamer

User-generated content is a crucial factor for me when buy/playing a game

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Have you used the level editor In Trials Fusion before?

- Yes
- No

If the respondent <u>have not used</u> the level editor

What is the reason you do not use the level editor? (you may choose more than one answer)

- The level editor is hard to use
- I find level creation boring/timeconsuming
- I do not see my self as creative enough to come up with good ideas for a level
- I prefer to just play content generated from other users
- I have just started playing the game, but I would like to try it in the future
- Other (*textfield*)

Do you engage in level creation/mod creation in other games)

- Yes
- No

If the respondent <u>have used</u> the level editor

Have you completed and published/shared a level?

- Yes
- Yes, I have completed and shared several levels
- Yes, I have completed a level, but not shared with anyone
- No

On a scale of 1 (easy) to 10 (hard), how easy/hard was/is it to use the editor?

How many hours have you spent playing the game? (roughly estimated)

How many hours have you spent playing creating levels in the game? (roughly estimated)

Do you engage in level creation/mod creation in other games?

- Yes
- No

B Survey results and analysis

B.1 GTA V results and analysis

Total respondents: 275

Table 1.A I am a

Gender	Percentage of respondents	Number of respondents
Male	93,8%	258
Female	6,2%	17

Table 2.A Have you used the in-game editor in GTA V before?

	Percentage of respondents	Number of respondents
Yes	50%	138
No	50%	138

Table 3.A How old the GTA V players are

Age	Percentage	Number of respondents
0-19	44,2%	122
20-25	30,8%	85
26-30	10,1%	28
31-40	8,3%	23
41-55	5,8%	16
56+	0,7%	2

Table 4.A Age of the respondents who have used the editor

Age	Percentage of respondents	Number of respondents
0-19	48,6%	67
20-25	29,7%	41
26-30	8,7%	12
31-40	5,8%	8
41-55	7,2%	10
56+	0%	0

Table 5.A Age of the respondents who have not used the editor

Age	Percentage of respondents	Number of respondents
0-19	39,9%	55
20-25	31,9%	44
26-30	11,6%	16
31-40	10,9%	15
41-55	4,3%	6
56+	1,4%	2

The younger the players are, the more likely is it that they have used the editor. 54.9% of the players who is 19 years or younger have used the editor within its age group, compared to the average of 50%. The participating numbers of those who have used the editor decreases for each older age group, except for the age group 41-55 where the participation is higher than average (62,5%).

Table 6.A The respondents play GTA V on (respondents may choose several options)

	Percentage	Number of respondents
PC	54,3%	150
Xbox 360	6,2%	13
Xbox One	19,6%	54
PlayStation 3	6,9%	19
PlayStation 4	32,6%	90

The vast majority of players play on a computer only (120 respondents). 65 respondents play on PlayStation 4 only and 37 respondents play on Xbox One only. The other respondents play a computer combined with one more consoles, or on several consoles.

Table 7.A What aspects are important to you when playing a game (respondents may choose several options)

	Percentage	Number of respondents
The competitive aspect	41,8%	114
The creative aspect	68,9%	188
The social aspect	60,8%	166

Most respondents answered the competitive aspect only (64 respondents), followed by the combination the social aspect - the creative aspect (62 respondents) and the competitive aspect - creative aspect - the social aspect (41 respondents). Most players seem to emphasize the creative and social aspect, which may be because GTA V is an open world game with sandbox elements.

Table 8.A What type of gamer the respondents see themselves as

Type of gamer	Percentage	Number of respondents
Casual gamer	35,4%	95
Core gamer	47,7%	127
Hardcore gamer	17,2%	46

Most respondents are casual and core gamers. Comparing these characteristics to time spent playing the game; we can see that the hardcore gamers are also those who have invested most hours in the game. Core and hardcore gamers are more likely to be males, 19 years or younger and have used the in-game editor.

Table 9.A User-generated content is a crucial factor for me when buying/playing a game

Statement	Percentage	Number of respondents
Strongly disagree	5,4%	15
Disagree	14,1%	39
Neutral	47,8%	132
Agree	27,5%	76
Strongly agree	5,1%	14

UGC doesn't seem to be very important for most respondents when buying/playing a game, as only 30% agree or strongly agree. Those who agree or strongly agree are more likely to have used the in-game editor. 12 of the 14 who strongly agree have used the editor, compared to 4 of 15 who strongly disagree.

50% of the respondents have not used the in-game editor in GTA V

Table 10.A What is the reason you do not use the level editor? (Respondents may choose more than one answer)

Statement	Percentage	Number of respondents
The level editor is hard to use	2,2%	3
I find level creation boring/time consuming	35%	48
I do not see myself as creative enough to come up with good ideas for a level	45,3%	62
I prefer to just play content generated from other players	62%	85
I have just started playing the game, but I would like to try it in the future	7,3%	10
Other	5,8%	8

25 respondents prefer to just play content generated from other players, but the majority find it boring/time consuming or they do not see themselves as creative enough to come up with good ideas for a level, and therefore prefer to play content generated from other players. Those who responded "other" said they hadn't come around it yet.

Table 11.A Do you engage in level creation/mod creation in other games?

Answer	Percentage	Number of respondents
Yes	24,6%	34
No	75,4%	104

50% of the respondents have used the in-game editor in GTA V

Table 12.A Have you completed and shared a level?

Answer	Percentage	Number of respondents
Yes	34,8%	48
Yes, I have completed and shared several levels	35,5%	49
Yes, I have completed a level, but not shared it with anyone	15,9%	22
No	13,8%	19

86,2% of the respondents have created and completed at least one level. 50% in the age group 26-40 have completed and shared several levels, compared to 38,8% in the 0-19 age group. Casual gamers are less likely to have completed and shared several levels (29,6%) compared to core (37,7%) and hardcore gamers (36,4%).

Table 13.A Do you engage in level creation/mod creation in other games?

Statement	Percentage	Number of respondents
Yes	47,1%	65
No	52,9%	73

Respondents who have used the GTA V editor are much more likely to have used other editors in other games or are engaged in some other way, compared to respondents who have not used the GTA V editor (Table 11.A).

The respondents who have used the Portal 2 editor were asked how much time they have spent played the game, and how much they have spent using the editor, roughly estimated in hours. 84 of the respondents answered between 1-100 hours of game time. 56 respondents have over 100 up to 1500 hours of game time. The respondents with fewest hours of playtime have also spent the least amount of time using the editor. Only 10 respondents have over 100 hours invested in the editor. 99 respondents have 10 hours or less in the editor.

B.1.1 What player types find the editor easy-to-use

The respondents who said they have used the in-game editor were asked to rate the game editor based on a scale of 1 (easy to use) to 10 (hard to use).

The average score of everyone who use or have tried the editor is 5.72 (based on 138 respondents - 50% of the total respondents).

Table 14.A Players who have used the GTA V editor

Age	Average rating	Percentage	Number of respondents
0-19	5.96	48,6%	67
20-25	5.61	29,7%	41
26-30	5.17	8,7%	12
31-40	5.13	5,8%	8
41-55	5.80	7,2%	10

The most frequent rating of the 0-19 age group was 7 and 8 (15 respondents). 1, 2 and 9 were rated by only one player, and no players rated the editor a 10. The 20-25 age group mostly rated the editor a 4 (9 respondents) followed by 6 and 8 (7 respondents). 3 players in this age group rated the editor a 10. Players in the age group 26-30 mostly rated the editor a 4 (4 respondents), followed by 7 and 8 (3 and 2 respondents). For the age group 30-41, the game editor was rated 1, 6 and 8 by two respondents, and 4 and 7 by one respondent. The 41-55 age group rated the editor mostly 4 and 7 (3 respondents) followed by 3 (2 respondents), 9 and 10 (1 respondent). No respondents over the age of 55 had used the editor.

Table 15.A Type of gamers

Type of gamer	Average rating	Percentage	Number of respondents
Casual gamers	6.19	19,7%	27
Core gamers	5.61	56,2%	77
Hardcore gamers	5.55	24,1%	33

Casual gamers find the editor harder to use than core and hardcore gamers. Most casual gamer rated the editor a 7 (7 respondents), followed by 8 (5 respondents) and 5 (5 respondents). Most core gamers rated the editor 7 as well (15 respondents), closely followed by 6 and 8 (14 respondents). The most occurred rating by hardcore gamers was 4 (9 respondents) followed by 6 and 8 (6 respondents).

Table 16.A What aspects the respondents value

Aspects	Average rating	Percentage	Number of respondents
Creative	5.81	70,3%	97
Non-creative	5.51	29,7%	41

Players who value the creative aspects when playing a game find the editor tool harder to use than for those who find the creative aspect less valuable. For those who valued the creative aspect (amongst other aspects) rated the editor an 8 (22 respondents) most often, followed by 6 (19 respondents) and 7 (15 respondents). 2 and 10 were the least frequent ratings, only rated by 1 player.

Table 17.A PC vs. gaming console

Gaming platform	Average rating	Percentage	Number of respondents
Console	5.91	51,3%	60
PC	5.46	48,7%	56

The most common rating for console players were 7 (13 respondents) and 8 (12 respondents). PC players rated the editor 6 most often (12 respondents), followed by 8 (10 respondents) and 4 (8 respondents). 30 respondents were playing the game on both PC and console, and were eliminated from the statistic as we do not know if the ratings are based on the editor on PC, console or both.

Table 18.A Have the respondents completed and shared levels

	Average rating	Percentage	Number of respondents
Yes	5,71	34,8%	48
Yes, completed and shared several levels	5.51	35,5%	49
Yes, completed, but not shared with anyone	6.18	15,9%	22
No	5.79	13,8%	19

Those who did not complete the level had a most frequent rating by 3 and 7 (5 respondents). Those who have completed and shared a level answered 4 (12 respondents) and 8 (11 respondents) most often. Interestingly, those who have completed and shared several levels rated the editor an 8 most frequently (11 respondents) followed by 4 (9 respondents). Those who had completed, but not shared a level rated the editor a 6 most frequent (5 respondents), followed by 7 (4 respondents) and 3, 4 and 8 (3 respondents).

B.2 Portal 2 results and analysis

Total respondents: 272

Table 1.B I am a

Gender	Percentage of respondents	Number of respondents
Male	85,1%	229
Female	14,9%	40

Table 2.B Have you used the in-game editor in Portal 2 before?

	Percentage of respondents	Number of respondents
Yes	55%	149
No	40%	122

Table 3.B How old the Portal 2 players are

Age	Percentage	Number of respondents
0-19	53,2%	142
20-25	30%	80
26-30	7,9%	21
31-40	5,6%	15
41-55	3%	8
56+	0,4%	1

Table 4.B Age of the respondents who have used the editor

Age	Percentage of respondents	Number of respondents
0-19	67,3%	99
20-25	25,9%	38
26-30	4,1%	6
31-40	2%	3
41-55	0,7%	1
56+	0%	0

Table 5.B Age of the respondents who have not used the editor

Age	Percentage of respondents	Number of respondents
0-19	35,8%	43
20-25	35%	42
26-30	12,5%	15
31-40	10%	12
41-55	5,8%	7
56+	0,8%	1

Table 6.B The respondents play Portal 2 on (respondents may choose several options)

	Percentage	Number of respondents
PC	91,3%	247
Xbox 360	13,4%	36
PlayStation 3	11,5%	31

The majority of players play on a computer only (202 respondents). Only a few respondents play on PlayStation 3 (10 respondents) and Xbox 360 only (12 respondents). 45 respondents play on a computer combined with a console.

Table 7.B What aspects are important to you when playing a game (respondents may choose several options)

	Percentage	Number of respondents
The competitive aspect	36,2%	96
The creative aspect	89,8%	238
The social aspect	30,9%	82

Most respondents answered the competitive aspect only (125 respondents), followed by the combination the competitive aspect - the creative aspect (43 respondents) and the creative aspect - the social aspect (43 respondents). 27 respondents answered all the options combined. 89,8% answering "The creative aspect" may indicate that Portal 2 players emphasize on creativity, for example by thinking creative, or because of the creative gameplay which Portal 2 offers.

Table 8.B What type of gamer the respondents see themselves as

Type of gamer	Percentage	Number of respondents
Casual gamer	35,4%	95
Core gamer	47,7%	127
Hardcore gamer	17,2%	46

Most players are casual and core gamers. Comparing these characteristics to time spent playing the game; we can see that the hardcore gamers are also those who have invested most hours in the game. Hardcore gamers are much more likely to use (or have used) the editor (70%) compared to core gamers (59%) and causal gamers (44%).

Table 9.B User-generated content is a crucial factor for me when buying/playing a game

Statement	Percentage	Number of respondents
Strongly disagree	7%	19
Disagree	15,6%	42
Neutral	47,7%	128
Agree	25,2%	68
Strongly agree	4,8%	13

As with GTA V, UGC doesn't seem to be very important to most players. Those who agree or strongly agree are more likely to have used the in-game editor. 10 of the 13 who strongly agree have used the editor, compared to 3 of 19 who strongly disagree.

55% of the respondents have not used the in-game editor in Portal 2

Table 10.B What is the reason you do not use the level editor? (Respondents may choose more than one answer)

Statement	Percentage	Number of respondents
The level editor is hard to use	2,5%	3
I find level creation boring/time consuming	26,4%	32
I do not see myself as creative enough to come up with good ideas for a level	49,6%	60
I prefer to just play content generated from other players	57%	69
I have just started playing the game, but I would like to try it in the future	10,7%	13
Other	13,2%	16

25 respondents prefer to just play content generated from other players, but the majority find it boring/time consuming or they do not see themselves as creative enough to come up with good ideas for a level, and therefore prefer to play content generated from other players. Those who responded "other" said they hadn't come around it yet.

Table 11.B Do you engage in level creation/mod creation in other games?

Answer	Percentage	Number of respondents
Yes	50,3%	75
No	49,7%	74

50% of the respondents have used the in-game editor in Portal 2

Table 12.B Have you completed and shared a level?

Answer	Percentage	Number of respondents
Yes	23,6%	35
Yes, I have completed and shared several levels	27%	40
Yes, I have completed a level, but not shared it with anyone	25%	37
No	24,3%	36

75,7% of the respondents have created and completed at least one level. This distribution is evenly throughout all age groups. Casual gamers are less likely to have completed and shared several levels (19%) compared to core (25,7%) and hardcore gamers (40,6%).

Table 13.B Do you engage in level creation/mod creation in other games?

Statement	Percentage	Number of respondents
Yes	50,3%	75
No	49,7%	74

Respondents who have used the Portal 2 editor are not significantly more likely to have used other editors in other games, compared to respondents who have not used the Portal 2 editor (Table 11.B).

The respondents who have used the Portal 2 editor were asked how much time they have spent played the game, and how much they have spent using the editor, roughly estimated in hours. 100 of the respondents answered between 1-100 hours of game time. 44 respondents have over 100 up to 1500 hours of game time. 98 of the respondents have spent 10 hours or less in the editor. 34 respondents have spent between 11 and 100 hours in the editor, and only 10 respondents have spent over 100 hours in the editor. Time spent playing the game and time spent using the editor has a significant correlation. We can see that the players with fewest hours of game time have also spent the least amount of time using the editor.

B.2.1 What player types find the editor easy-to-use

The respondents who said they have used the in-game editor were asked to rate the game editor based on a scale of 1 (easy to use) to 10 (hard to use).

The average score of everyone who use or have tried the editor is 4.49 (based on 149 respondents - 55% of the total respondents).

Table 14.B Players who have used the Portal 2 editor

Age	Average rating	Percentage	Number of respondents
0-19	4.96	67,3%	99
20-25	4.05	25,9%	38
26-30	3.67	4,1%	6
31-40	6.33	0,7%	3

The most frequent rating of the 0-19 age group was 3 (20 respondents) and 8 (15 respondents). 1, 2 and 7 were rated by over 10 respondents. The 20-25 age group mostly rated the editor a 3 (9 respondents) followed by 1 and 2 (6 respondents), with no respondents rating the editor a 10. Players in the age group 26-30 rated the editor a 3 (2 respondents), followed by 1, 2, 6 and 7 (1 respondent). For the age group 31-40, the game editor was rated 5, 6 and 8 by one respondent each.

Table 15.B Type of gamers

Type of gamer	Average rating	Percentage	Number of respondents
Casual gamers	4.17	28,2%	42
Core gamers	4.61	50,3%	75
Hardcore gamers	4.63	21,5%	32

Casual gamers find the editor easier to use than core and hardcore gamers. Most casual gamer rated the editor a 3 (12 respondents), followed by 2 and 8 (7 respondents). 4, 5, 6, 7 and 9 were rated by 1-3 respondents. Most core gamers rated the editor 3 as well (15 respondents), followed by 1, 8 (12 respondents) and 7 (11 respondents). The most occurred rating by hardcore gamers

were 2 (6 respondents) followed by 6 (5 respondents) and 3 (4 respondents). The other ratings had 2 or 3 respondents, except 10 (0 respondents).

Table 16.B What aspects the respondents value

Aspects	Average rating	Percentage	Number of respondents
Creative	4.52	89%	138
Non-creative	4.12	11%	17

Players who value the creative aspects when playing a game find the editor tool harder to use than for those who find the creative aspect less valuable. For those who value the creative aspect (amongst other aspects) rated the editor a 3 (26 respondents) most often, followed by 1,2 and 8 (19 respondents). 1 respondent rated the editor a 10.

Table 17.B PC vs. gaming console

Gaming platform	Average rating	Percentage	Number of respondents
PC	4.27	51,3%	117
Console	5	48,7%	2

Respondents who play Portal 2 on a computer only rated the editor 3 most often (23 respondents), followed by 1 (20 respondents) and 2 (17 respondents). Only 2 players who have used the editor are only playing on a console.

Table 18.B Have the respondents completed and shared levels

	Average rating	Percentage	Number of respondents
Yes	4.43	23,6%	35
Yes, completed and shared several levels	3.92	27%	40
Yes, completed, but not shared with anyone	4.86	25%	37
No	4.83	24,3%	36

The respondents who did not complete a level rated the editor a 5 (7 respondents) and 7 (6 respondents) most frequently. Those who have completed and shared a level answered 1 and 8 (7 respondents), and 2 and 3 (6 respondents) most frequently. Those who have completed and shared several levels rated the editor a 2 most frequently (10 respondents) followed by 1 and 3 (7 respondents). Those who had completed, but not shared a level rated the editor a 3 most frequently (13 respondents), followed by 8 (7 respondents) and 7 (5 respondents).

B.3 LittleBigPlanet 3 results and analysis

Total respondents: 100

Table 1.C I am a

Gender	Percentage of respondents	Number of respondents
Male	89%	89
Female	11%	11

Table 2.C Have you used the in-game editor in LBP3 before?

	Percentage of respondents	Number of respondents
Yes	90%	90
No	10%	10

Table 3.C How old the LBP 3 players are

Age	Percentage	Number of respondents
0-19	63%	63
20-25	14%	14
26-30	13%	13
31-40	8%	8
41-55	0%	0
56+	2%	2

Table 4.C Age of the respondents who have used the editor

Age	Percentage of respondents	Number of respondents
0-19	59,6%	99
20-25	14,4%	13
26-30	11,1%	10
31-40	6,7%	6
41-55	0%	0
56+	2,2%	2

Table 5.C Age of the respondents who have not used the editor

Age	Percentage of respondents	Number of respondents
0-19	40%	4
20-25	10%	1
26-30	30%	3
31-40	20%	2

Table 6.C What aspects are important to you when playing a game (respondents may choose several options)

	Percentage	Number of respondents
The competitive aspect	33%	33
The creative aspect	89%	89
The social aspect	52%	52

Most respondents answered the creative aspect only (39 respondents), followed by the combination the creative aspect - the social aspect (29 respondents) and the three options combined (15 respondents). As with Portal 2, the creative aspect seems to be the most important to respondents who play LBP 3.

Table 7.C What type of gamer the respondents see themselves as

Type of gamer	Percentage	Number of respondents
Casual gamer	31%	31
Core gamer	56%	56
Hardcore gamer	13%	13

Most players are casual and core gamers. Comparing these characteristics to time spent playing the game; we can see that the hardcore gamers are also those who have invested most hours in the game. Hardcore gamers are much more likely to use (or have used) the editor (100%) compared to core gamers (94,5%) and causal gamers (42%).

Table 8.C User-generated content is a crucial factor for me when buying/playing a game

Statement	Percentage	Number of respondents
Strongly disagree	5%	5
Disagree	10%	10
Neutral	50%	50
Agree	25%	25
Strongly agree	10%	10

UGC doesn't seem to be very important to most players, but there are a few more respondents who agree or strongly agree, than who disagree or strongly disagree. Those who agree or strongly agree are more likely to have used the in-game editor. Every respondent who agree or strongly agree to the statement have used the editor, compared to 12 of the 15 respondents who disagree or strongly disagree.

10% of the respondents have not used the in-game editor in LBP 3

Table 9.C What is the reason you do not use the level editor? (Respondents may choose more than one answer)

Statement	Percentage	Number of respondents
The level editor is hard to use	0%	0
I find level creation boring/time consuming	10%	1
I do not see myself as creative enough to come up with good ideas for a level	30%	3
I prefer to just play content generated from other players	40%	4
I have just started playing the game, but I would like to try it in the future	40%	4
Other	20%	2

Only 10 respondents have not used the editor, and those who have do not see themselves as creative enough to come up with good ideas for a level, or have not gotten around it yet.

Table 10.C Do you engage in level creation/mod creation in other games?

Answer	Percentage	Number of respondents
Yes	40%	4
No	60%	6

90% of the respondents have used the in-game editor in LBP 3

Table 11.C Have you completed and shared a level?

Answer	Percentage	Number of respondents
Yes	24,4%	22
Yes, I have completed and shared several levels	61,1%	55
Yes, I have completed a level, but not shared it with anyone	7,8%	7
No	6,7%	6

The majority, 75,5% of the respondents, have completed and shared at least one level. The 20-25 age group are more likely to have completed and shared several levels (76,9%) compared to the 0-19 age group (66,1%) and 26-30 age group (40%). Casual (62,5%), core (61,5%) and hardcore gamers (61,5%) are evenly likely to have completed and shared several levels. However, all hardcore gamers have completed and shared at least one level.

Table 12.C Have you enabled the "Advanced Creator Mode"?

Statement	Percentage	Number of respondents
Yes	82,2%	74
No	7,8%	7
I did not know this was an option	10%	10

The "Advanced Creator Mode" is a menu option which players can activate to gain access to more features and items in the game editor. It is disabled by default, so the player has to actively locate this option and enable it from the game menu. The respondents who did not know this was an option are therefore more likely to have this option disabled. Casual gamers (75%) are less likely to have this option enabled compared to core (86,5%) and hardcore (84,6%) gamers.

Table 13.C Do you engage in level creation/mod creation in other games?

Statement	Percentage	Number of respondents
Yes	68,9%	62
No	31,1%	28

Respondents who have used the LBP editor 3 are significantly more likely to have used other editors in other games, compared to respondents who have not used the LBP 3 editor (Table 10.C).

The respondents who have used the TF editor were asked how much time they have spent played the game, and how much they have spent using the editor, roughly estimated in hours. 38 of the respondents answered between 1-100 hours of game time. 41 respondents have over 100 up to 2000 hours of game, and 5 respondents had more than 2000 hours of game time. 22 of the respondents have spent 10 hours or less in the editor. 22 respondents have spent between 11 and 100 hours in the editor. The majority (40) of the respondents have spent have spent over 100 hours in the editor, up to 1500 hours. Time spent playing the game and time spent using the editor has a significant correlation. We can see that the players with fewest hours of game time have also spent the least amount of time using the editor.

B.3.1 What player types find the editor easy-to-use

The respondents who said they have used the in-game editor were asked to rate the game editor based on a scale of 1 (easy to use) to 10 (hard to use).

The average score of everyone who use or have tried the editor is 4.74 (based on 90 respondents - 90% of the total respondents).

Table 13.C Players who have used the LBP 3 editor

Age	Average rating	Percentage	Number of respondents
0-19	4.97	65,6%	59
20-25	5.85	14,4%	13
26-30	6.40	11,1%	10
31-40	6.33	6,7%	6
56+	1	2,2%	2

The most frequent rating of the 0-19 age group was 7 (13 respondents) and 2 (10 respondents). 1, 3, 8 and 9 were rated by 6 respondents each. The 20-25 age group mostly rated the editor an 8 (4 respondents) followed by 6 (3 respondents). No respondents in this age group rated the editor a 9 or 10. Players in the age group 26-30 rated the editor a 7 (3 respondents) and 8 (2 respondents), followed by 3, 4, 5, 6 and 9 (1 respondent). For the age group 31-40, the game editor was rated 5 (3 respondents), and 7, 8 & 9 (1 respondent). The two respondents in the 55+ age group rated the editor a 1.

Table 14.C Type of gamers

Type of gamer	Average rating	Percentage	Number of respondents
Casual gamers	5.08	24%	27
Core gamers	4.61	58,4%	52
Hardcore gamers	4.63	14,6%	13

Casual gamers find the editor easier to use than core and hardcore gamers. Most casual gamer rated the editor a 2, 7 and 8 (4 respondents), followed by 3 and 5 (3 respondents). Most core gamers rated the editor 7 (13 respondents), followed by 8 (8 respondents) and 3 (7 respondents). The most occurred rating by hardcore gamers were 1 (4 respondents) followed by 2 (3 respondents) and 6 & 7 (2 respondents).

Table 15.C What aspects the respondents value

Aspects	Average rating	Percentage	Number of respondents
Creative	5.39	92%	81
Non-creative	4.57	8%	7

Players who value the creative aspects when playing a game find the editor tool harder to use than for those who find the creative aspect less valuable. For those who value the creative aspect (amongst other aspects) rated the editor a 7 (18 respondents) most often, followed by 8 (10 respondents). The respondent that did not value the creative aspect rated the editor a 1, 2, 3, 5, 5, 8, 8.

Table 16.C "Advanced Creator Mode" vs. basic/default mode

	Average rating	Percentage	Number of respondents
Advanced Creator Mode	5.35	82,2%	74
Basic/default mode	4.88	17,8%	16

Respondents who have enabled the "Advanced Creator Mode" rated the editor 7 most often (17 respondents), followed by 8 (10 respondents) and 1 (9 respondents). The respondents who have used the editor in basic/default mode only rated the editor an 8 (3 respondents), followed by 2-7 (2 respondents) and 1 (1 respondent).

Table 17.C Have the respondents completed and shared levels

	Average rating	Percentage	Number of respondents
Yes	4.91	24,4%	22
Yes, completed and shared several levels	5.18	61,6%	55
Yes, completed, but not shared with anyone	6.00	7,8%	7
No	6.50	6,7%	6

The respondents who did not complete a level rated the editor a 7 (2 respondents) and 2, 6, 8 & 9 (1 respondent). Those who have completed and shared a level answered 6, 7 & 8 (4 respondents), and 1 (3 respondents) most frequently. Those who have completed and shared several levels rated the editor a 7 most frequently (12 respondents) followed by 2 (8 respondents) and 3 (7 respondents). Those who had completed, but not shared a level rated the editor a 9 (2 respondents), followed by 1, 3, 5, 7 & 9 (1 respondent).

B.4 Trials Fusion results and analysis

Total respondents: 100

Table 1.D I am a

Gender	Percentage of respondents	Number of respondents
Male	97%	97
Female	3%	3

Table 2.D Have you used the in-game editor in TF before?

	Percentage of respondents	Number of respondents
Yes	76%	76
No	24%	24

Table 3.D How old the TF players are

Age	Percentage	Number of respondents
0-19	25%	25
20-25	36%	36
26-30	12%	12
31-40	19%	19
41-55	7%	7

Table 4.D Age of the respondents who have used the editor

Age	Percentage of respondents	Number of respondents
0-19	26,7%	20
20-25	30,7%	23
26-30	13,3%	10
31-40	21,3%	16
41-55	8%	6

Table 5.D Age of the respondents who have not used the editor

Age	Percentage of respondents	Number of respondents
0-19	20,8%	5
20-25	54,2%	13
26-30	8,3%	2
31-40	12,5%	3
41-55	4,2%	1

Table 6.D The respondents play TF on (respondents may choose several options)

	Percentage	Number of respondents
PC/MAC	50,5%	50
Xbox 360	13,1%	13
Xbox One	39,4%	39
PlayStation 4	33,3%	33

The majority of players play on a computer (30 respondents), Xbox One (24 respondents) or PlayStation 4 (22 respondents) only. The other respondents play the game on a computer/MAC and at least one console.

Table 7.D What aspects are important to you when playing a game (respondents may choose several options)

	Percentage	Number of respondents
The competitive aspect	74,7%	74
The creative aspect	54,5%	54
The social aspect	41,4%	41

Most respondents answered the competitive aspect only (29 respondents), followed by the combination the competitive aspect - the creative aspect (16 respondents) and the three aspects combined (15 respondents). 14 respondents value the creative aspect only.

Table 8.D What type of gamer the respondents see themselves as

Type of gamer	Percentage	Number of respondents
Casual gamer	11%	11
Core gamer	49%	49
Hardcore gamer	40%	40

Most players are core and hardcore gamers. Comparing these characteristics to time spent playing the game; we can see that the core and hardcore gamers are also those who have invested most hours in the game. Hardcore gamers are somewhat more likely to use (or have used) the editor (80%) compared to core gamers (73,5%) and causal gamers (72,7%), but the difference is not significant.

Table 9.D User-generated content is a crucial factor for me when buying/playing a game

Statement	Percentage	Number of respondents
Strongly disagree	2%	2
Disagree	14%	14
Neutral	31%	31
Agree	38%	38
Strongly agree	15%	15

UGC is an important factor to the majority of the respondents (53%). Those who agree or strongly agree are slightly less likely to have used the editor, compared to those who disagree or strongly disagree. 40 of the 53 (75,5%) who agree strongly agree have used the editor, compared to 13 of 16 (81,3%) who disagree or strongly disagree.

24% of the respondents have not used the in-game editor in TF

Table 10.D What is the reason you do not use the level editor? (Respondents may choose more than one answer)

Statement	Percentage	Number of respondents
The level editor is hard to use	20,8%	5
I find level creation boring/time consuming	33,3%	8
I do not see myself as creative enough to come up with good ideas for a level	58,3%	14
I prefer to just play content generated from other players	79,2%	19
I have just started playing the game, but I would like to try it in the future	8,3%	2
Other	0%	0

6 respondents prefer to just play content generated from other players, and the other respondents answered a combination of "I prefer to just play content generated from other players" and the other options. 2 respondents answered "The level editor is hard to use" only.

Table 11.D Do you engage in level creation/mod creation in other games?

Answer	Percentage	Number of respondents
Yes	12,5%	3
No	87,5%	21

76% of the respondents have used the in-game editor in TF

Table 12.D Have you completed and shared a level?

Answer	Percentage	Number of respondents
Yes	17,3%	13
Yes, I have completed and shared several levels	54,7%	41
Yes, I have completed a level, but not shared it with anyone	13,3%	10
No	14,7%	11

72% of the respondents have created and completed at least one level. This distribution is evenly throughout all age groups. The 20-25 (58%), 26-30 (60%) and 31-30 (62,5%) age group are more likely to have completed and shared several levels, compared to the 0-19 age group (36,8%). Core gamers are more likely to have completed and shared several levels (63,9%) compared to casual (42,9%) and hardcore gamers (46,9%).

Table 13.D Do you engage in level creation/mod creation in other games?

Statement	Percentage	Number of respondents
Yes	39,5%	30
No	60,5%	46

Respondents who have used the TF are significantly more likely to have used other editors in other games, compared to respondents who have not used the TF editor (Table 11.D).

The respondents who have used the TF editor were asked how much time they have spent playing the game, and how much time they have spent using the editor, roughly estimated in hours. 20 of the respondents answered between 1-100 hours of game time. 55 respondents have over 100 up to 1500 hours of game time. 41 respondents have spent 10 hours or less in the editor. 15 respondents have spent between 11 and 100 hours in the editor, and 21 respondents have over 100 hours spent using the editor. Time spent playing the game and time spent using

the editor has a significant correlation. We can see that the players with fewest hours of game time have also spent the least amount of time using the editor.

B.4.1   What player types find the editor easy-to-use

The respondents who said they have used the in-game editor were asked to rate the game editor based on a scale of 1 (easy to use) to 10 (hard to use).

The average score of everyone who use or have tried the editor is 4.49 (based on 149 respondents - 55% of the total respondents).

Table 14.D Players who have used the TF editor

Age	Average rating	Percentage	Number of respondents
0-19	6.10	26,7%	20
20-25	5.35	30,7%	23
26-30	5.97	13,3%	10
31-40	5.50	21,3%	16
41-55	6.50	8%	6

The most frequent rating of the 0-19 age group was 7 (6 respondents) and 6 (5 respondents), followed by 5 (3 respondents) and 8 (2 respondents). 2, 3, 4 and 10 were rated by 1 respondent each. The 20-25 age group mostly rated the editor a 5 (6 respondents) followed by 7 (5 respondents). Players in the age group 26-30 rated the editor a 3 (3 respondents), followed by 4, 7 & 8 (2 respondents) and 6 (1 respondent). For the 31-40 age group, the game editor was rated 3 & 7 (3 respondents) 4, 5, 6 & 9 (2 respondents) and 2 & 8 by one respondent each. In the 41-55 age group, the editor was rated 3, 5, 6, 7, 8 & 9 by one respondent each.

Table 15.D Type of gamers

Type of gamer	Average rating	Percentage	Number of respondents
Casual gamers	5.13	28,2%	42
Core gamers	5.56	50,3%	75
Hardcore gamers	6.03	21,5%	32

Casual gamers find the editor easier to use than core and hardcore gamers. Most casual gamer rated the editor a 6 (3 respondents), followed by 3 (2 respondents) and 4, 5 & 8 (1 respondent). Most core gamers rated the editor 5 (8 respondents), followed by 7 (6 respondents) and 6 & 8 (5 respondents). The most occurred rating by hardcore gamers were 7 (11 respondents) followed by 5 (6 respondents) and 4 (4 respondents).

Table 16.D What aspects the respondents value

Aspects	Average rating	Percentage	Number of respondents
Creative	5.43	61,8%	47
Non-creative	6.12	38,2%	29

Players who value the creative aspects when playing a game find the editor tool harder to use than for those who find the creative aspect less valuable. For those who value the creative aspect (amongst other aspects) rated the editor a 5 (10 respondents) most often, followed by 3 (9 respondents) and 6 (8 respondents).

Table 17.D PC vs. gaming console

Gaming platform	Average rating	Percentage	Number of respondents
PC/MAC	5.77	29,8%	17
Console	5.65	70,2%	40

Respondents who play TF on a computer only rated the editor 6 & 7 most often (4 respondents), followed by 5 (3 respondents) and 4 (2 respondents). Console players rated the editor 7 most often (9 respondents) followed by 3 and 5 (7 respondents).

Table 18.D Have the respondents completed and shared levels

	Average rating	Percentage	Number of respondents
Yes	5.77	17,3%	13
Yes, completed and shared several levels	5.51	54,7%	41
Yes, completed, but not shared with anyone	5.90	13,3%	10
No	6.18	14,7%	11

The respondents who did not complete a level rated the editor a 7 (4 respondents), followed by 6 & 8 (2 respondents) most frequently. Those who have completed and shared a level answered 10 (3 respondents), and 2 & 3 (2 respondents) most frequently. 1, 2, 4, 6, 7, 8 & 9 had one rating each. Those who have completed and shared several levels rated the editor a 5 & 7 most frequently (10 respondents) followed by 4 (6 respondents) and 3 (5 respondents). Those who had completed, but not shared a level rated the editor a 6 most frequently (3 respondents), followed by 5, 7 & 8 (2 respondents) and 1 (1 respondent).

C Tasks and observation notes

C.1 GTA V tasks

1: Find creator contend – Maximum estimated completion time: 1 minute.

2: Add capture details: - Maximum estimated completion time: 1 minute.

Players: 8 – Teams: 2

5 minute time limit

3: Place trigger location anywhere on the map - Maximum estimated completion time: 1 minute.

4: Add startpoint for team 1 and team 2 - Maximum estimated completion time: 2 minutes.

5: Add respawn for team 1 and team 2 - Maximum estimated completion time: 2 minutes.

6: Add capture point for team 1 and team 2 - Maximum estimated completion time: 2 minutes.

7: Place 1 "suitcase" anywhere on the map as capture object - Maximum estimated completion time: 3 minutes.

8: Place two AI-controlled players anywhere on the map – one "female ranger" and one "Black Ops 1" - Maximum estimated completion time: 3 minutes.

9: Save the map - Maximum estimated completion time: 1 minute.

10: Test the map - Maximum estimated completion time: 3 minutes.

11: Place 1 "heavy pistol", 1 "assault rifle" and 1 "armor" anywhere on the map - Maximum estimated completion time: 3 minutes.

12: Place 1 "sedan Regina" in gray color anywhere on the map - Maximum estimated completion time: 3 minutes.

13: Place 1 "lawn mower" in red color anywhere on the map - Maximum estimated completion time: 3 minutes.

14: Place 1 "runway hut" on the map - Maximum estimated completion time: 3 minutes.

15: Pick up the "runway hut" and rotate it 180 degrees. - Maximum estimated completion time: 3 minutes.

16: Delete the "runway hut" - Maximum estimated completion time: 3 minutes.

17: Add a small ramp anywhere on the map - Maximum estimated completion time: 3 minutes.

18: Delete all "actors" - Maximum estimated completion time: 3 minutes.

19: Test the map - Maximum estimated completion time: 1 minute.

20: Save the map - Maximum estimated completion time: 1 minute.

C.1.1 Participant 1 observation notes

19 years old, hardcore gamer, 20/20 task completed

1: Find creator contend – Able to complete the task quickly.

2: Add capture details: - Able to complete the task quickly.

Players: 8 – Teams: 2

5 minute time limit

3: Place trigger location anywhere on the map - Able to complete the task quickly.

4: Add startpoint for team 1 and team 2 - Able to complete the task quickly.

5: Add respawn for team 1 and team 2 - Able to complete the task quickly.

6: Add capture point for team 1 and team 2 - Able to complete the task quickly.

7: Place 1 "suitcase" anywhere on the map as capture object - Able to complete the task quickly.

8: Place two AI-controlled players anywhere on the map – one "female ranger" and one "Black Ops 1" - Able to complete the task, but are not immedately able to locate the right category.

9: Save the map - Able to complete the task quickly.

10: Test the map - Able to complete the task quickly.

11: Place 1 "heavy pistol", 1 "assault rifle" and 1 "armor" anywhere on the map - Able to complete the task quickly.

12: Place 1 "sedan Regina" in gray color anywhere on the map - Able to complete the task quickly.

13: Place 1 "lawn mower" in red color anywhere on the map - Able to complete the task quickly.

14: Place 1 "runway hut" on the map - Able to complete the task, but had trouble locating the object, and was looking at several other menus before locating the object in the correct menu.

15: Pick up the "runway hut" and rotate it 180 degrees. - Able to complete the task quickly

16: Delete the "runway hut" - Able to complete the task quickly.

17: Go back to the editor and add a small ramp anywhere on te map - Able to complete the task quickly.

18: Delete all "actors" - Able to complete the task quickly.

19: Test the map - Able to complete the task quickly.

20: Save the map - Able to complete the task quickly.

C.1.2   Participant 2 observation notes

24 years old, core gamer, 20/20 task completed

1: Find creator contend – Able to complete the task quickly.

2: Add capture details: - Able to complete the task quickly.

Players: 8 – Teams: 2

5 minute time limit

3: Place trigger location anywhere on the map - Able to complete the task quickly.

4: Add startpoint for team 1 and team 2 - Able to complete the task quickly.

5: Add respawn for team 1 and team 2 - Able to complete the task quickly.

6: Add capture point for team 1 and team 2 - Able to complete the task quickly.

7: Place 1 "suitcase" anywhere on the map as capture object - Able to complete the task quickly.

8: Place two AI-controlled players anywhere on the map – one "female ranger" and one "Black Ops 1" - Able to complete the task, but are not immediately able to locate the right category.

9: Save the map - Able to complete the task quickly.

10: Test the map - Able to complete the task quickly.

11: Place 1 "heavy pistol", 1 "assault rifle" and 1 "armor" anywhere on the map - Able to complete the task, but are not immediately able to locate the right category.

12: Place 1 "sedan Regina" in gray color anywhere on the map - Able to complete the task, but are not immediately able to locate the right category.

13: Place 1 "lawn mower" in red color anywhere on the map - Able to complete the task quickly.

14: Place 1 "runway hut" on the map - Able to complete the task quickly.

15: Pick up the "runway hut" and rotate it 180 degrees. - Able to complete the task , but did not immediately know how to pick up the item, and had to guess by pressing several buttons.

16: Delete the "runway hut" - Able to complete the task quickly.

17: Add a small ramp anywhere on the map - Able to complete the task quickly.

18: Delete all "actors" - Able to complete the task quickly.

19: Test the map - Able to complete the task quickly.

20: Save the map - Able to complete the task quickly.

C.1.3 Participant 3 observation notes

25 years old, casual gamer, 20/20 task completed

1: Find creator contend – Able to complete the task quickly.

2: Add capture details: - Able to complete the task quickly.

Players: 8 – Teams: 2

5 minute time limit

3: Place trigger location anywhere on the map - Able to complete the task quickly.

4: Add startpoint for team 1 and team 2 - Able to complete the task quickly.

5: Add respawn for team 1 and team 2 - Able to complete the task quickly.

6: Add capture point for team 1 and team 2 - Able to complete the task quickly.

7: Place 1 "suitcase" anywhere on the map as capture object - Able to complete the task quickly.

8: Place two AI-controlled players anywhere on the map – one "female ranger" and one "Black Ops 1" - Able to complete the task quckly.

9: Save the map - Able to complete the task quickly.

10: Test the map - Able to complete the task quickly.

11: Place 1 "heavy pistol", 1 "assault rifle" and 1 "armor" anywhere on the map - Able to complete the task, but are not immedately able to locate the right category.

12: Place 1 "sedan Regina" in gray color anywhere on the map – Able to complete the task quickly.

13: Place 1 "lawn mower" in red color anywhere on the map - Able to complete the task quickly.

14: Place 1 "runway hut" on the map - Able to complete the task, but are not immedately able to locate the right category.

15: Pick up the "runway hut" and rotate it 180 degrees - Able to complete the task quickly.

16: Delete the "runway hut" - Able to complete the task quickly.

17: Go back to the editor and add a small ramp anywhere on the map - Able to complete the task quickly.

18: Delete all "actors" - Able to complete the task quickly.

19: Test the map - Able to complete the task quickly.

20: Save the map - Able to complete the task quickly.

C.1.4 Participant 4 observation notes

26 years old, casual gamer, 20/20 task completed

1: Find creator contend – Able to complete the task quickly.

2: Add capture details: - Able to complete the task quickly.

Players: 8 – Teams: 2

5 minute time limit

3: Place trigger location anywhere on the map - Able to complete the task quickly.

4: Add startpoint for team 1 and team 2 - Able to complete the task quickly.

5: Add respawn for team 1 and team 2 - Able to complete the task quickly.

6: Add capture point for team 1 and team 2 - Able to complete the task quickly.

7: Place 1 "suitcase" anywhere on the map as capture object - Able to complete the task quickly.

8: Place two AI-controlled players anywhere on the map – one "female ranger" and one "Black Ops 1" - Able to complete the task, but are not immedately able to locate the right category.

9: Save the map - Able to complete the task quickly.

10: Test the map - Able to complete the task quickly.

11: Place 1 "heavy pistol", 1 "assault rifle" and 1 "armor" anywhere on the map - Able to complete the task, but are not immedately able to locate the right category.

12: Place 1 "sedan Regina" in gray color anywhere on the map - Able to complete the task, but are not immedately able to locate the right category.

13: Place 1 "lawn mower" in red color anywhere on the map - Able to complete the task quickly.

14: Place 1 "runway hut" on the map - Able to complete the task, but are not immedately able to locate the right category.

15: Pick up the "runway hut" and rotate it 180 degrees. - Able to complete the task quickly

16: Delete the "runway hut" - Able to complete the task quickly.

17: Go back to the editor and add a small ramp anywhere on the map - Able to complete the task, but are not immedately able to locate the right category.

18: Delete all "actors" - Able to complete the task quickly.

19: Test the map - Able to complete the task quickly.

20: Save the map - Able to complete the task quickly.

C.1.5 Participant 5 observation notes

26 years old, casual gamer, 20/20 task completed

1: Find creator contend – Able to complete the task quickly.

2: Add capture details: - Able to complete the task quickly.

Players: 8 – Teams: 2

5 minute time limit

Place trigger location anywhere on the map - Able to complete the task quickly.

3: Add startpoint for team 1 and team 2 - Able to complete the task quickly.

4: Add respawn for team 1 and team 2 - Able to complete the task quickly.

5: Add capture point for team 1 and team 2 - Able to complete the task quickly.

6: Place 1 "suitcase" anywhere on the map as capture object - Able to complete the task quickly.

7: Place two AI-controlled players anywhere on the map – one "female ranger" and one "Black Ops 1" - Able to complete the task, but are not immediately able to locate the right category.

8: Save the map - Able to complete the task quickly.

9: Test the map - Able to complete the task quickly.

10: Place 1 "heavy pistol", 1 "assault rifle" and 1 "armor" anywhere on the map - Able to complete the task quickly.

11: Place 1 "sedan Regina" in gray color anywhere on the map - Able to complete the task, but are not immediately able to locate the right category**.**

12: Place 1 "lawn mower" in red color anywhere on the map - Able to complete the task quickly.

13: Place 1 "runway hut" on the map - Able to complete the task, but are not immediately able to locate the right category.

14: Pick up the "runway hut" and rotate it 180 degrees. - Able to complete the task quickly

15: Delete the "runway hut" - Able to complete the task quickly.

16: Add a small ramp anywhere on the map - Able to complete the task quickly.

17: Delete all "actors" - Able to complete the task quickly.

19: Test the map - Able to complete the task quickly.

20: Save the map - Able to complete the task quickly.

C.2 Portal 2

1: Start the level editor – Maximum estimated completion time: 1 minute.

2: Place 2 "turrets" anywhere on the map – Maximum estimated completion time: 2 minutes.

3: Create a 6x6 pool of "deadly goo" anywhere on the map – Maximum estimated completion time: 10 minutes.

4: Save the map – Maximum estimated completion time: 1 minute.

5: Test the map – Maximum estimated completion time: 1 minute.

6: Place a "button" on the map which is connected to the exit. – Maximum estimated completion time: 5 minutes.

7: Add "speed gel" to the map, place it in front of the exit – Maximum estimated completion time: 3 minutes.

8: Add "companion cube" to the map, place it anywhere on the map – Maximum estimated completion time: 2 minutes.

9: Add "bounce gel" – Maximum estimated completion time: 3 minutes.

10: Save the map – Maximum estimated completion time: 1 minute.

11: Test the map – Maximum estimated completion time: 1 minute.

C.2.1   Participant 1 observation notes

19 years old, hardcore gamer, 11/11 tasks completed

1: Start the level editor – Able to locate the editor from the menu and complete the task quickly.

2: Place 2 "turrets" anywhere on the map – Able to complete the task quickly.

3: Create a 6x6 pool of "deadly goo" anywhere on the map – Able to complete the task quickly.

4: Save the map – Able to complete the task quickly.

5: Test the map – Able to complete the task quickly.

6: Place a "button" on the map which is connected to the exit. – Able to complete the task quickly.

7: Add "speed gel" to the map, place it in front of the exit – Able to complete the task quickly.

8: Add "companion cube" to the map, place it anywhere on the map – Able to complete the task quickly.

9: Add "bounce gel" – Able to complete the task quickly.

10: Save the map – Able to complete the task quickly.

11: Test the map – Able to complete the task quickly.

C.2.2 Participant 2 observation notes

24 years old, core gamer, 11/11 tasks completed

1: Start the level editor – Able to locate the editor from the menu and complete the task quickly.

2: Place 2 "turrets" anywhere on the map – Able to complete the task quickly.

3: Create a 6x6 pool of "deadly goo" anywhere on the map – The user did not immediately understand which actions to perform to complete the task. Had to do some trial and error before being able to complete the task.

4: Save the map – Able to complete the task quickly.

5: Test the map – Able to complete the task quickly.

6: Place a "button" on the map which is connected to the exit. – Able to complete the task quickly.

7: Add "speed gel" to the map, place it in front of the exit – Able to complete the task quickly.

8: Add "companion cube" to the map, place it anywhere on the map – Able to complete the task quickly.

9: Add "bounce gel" – Able to complete the task quickly.

10: Save the map – Able to complete the task quickly.

11: Test the map – Able to complete the task quickly.

C.2.3 Participant 3 observation notes

25 years old, core gamer, 11/11 tasks completed

1: Start the level editor – Able to locate the editor from the menu and complete the task quickly.

2: Place 2 "turrets" anywhere on the map – Placed one of the turrets in the air, and did not immediately understand an error had occoured. Were able to correct after realizing it was an error.

3: Create a 6x6 pool of "deadly goo" anywhere on the map – The user did not immediately understand which actions to perform to complete the task. Had to do some trial and error before being able to complete the task.

4: Save the map – Able to complete the task quickly.

5: Test the map – Able to complete the task quickly.

6: Place a "button" on the map which is connected to the exit. – Able to complete the task quickly.

7: Add "speed gel" to the map, place it in front of the exit – Did not immediately understand how to attatch the item to the roof, but were able to complete the task after trial and error.

8: Add "companion cube" to the map, place it anywhere on the map – Able to complete the task quickly.

9: Add "bounce gel" – Able to complete the task quickly.

10: Save the map – Able to complete the task quickly.

11: Test the map – Able to complete the task quickly.

C.2.4 Participant 4 observation notes

26 years old, casual gamer, 11/11 tasks completed

1: Start the level editor – Able to locate the editor from the menu and complete the task quickly.

2: Place 2 "turrets" anywhere on the map – Able to complete the task quickly.

3: Create a 6x6 pool of "deadly goo" anywhere on the map – The user did not immediately understand which actions to perform to complete the task. Had to do some trial and error before being able to complete the task.

4: Save the map – Able to complete the task quickly.

5: Test the map – Able to complete the task quickly.

6: Place a "button" on the map which is connected to the exit. – Able to complete the task quickly.

7: Add "speed gel" to the map, place it in front of the exit – Able to complete the task quickly.

8: Add "companion cube" to the map, place it anywhere on the map – Able to complete the task quickly.

9: Add "bounce gel" – Able to complete the task quickly.

10: Save the map – Able to complete the task quickly.

11: Test the map – Able to complete the task quickly.

C.2.5 Participant 5 observation notes

31 years old, core gamer, 11/11 tasks completed

1: Start the level editor – Able to locate the editor from the menu and complete the task quickly.

2: Place 2 "turrets" anywhere on the map – Placed one of the turrets in the air, and did not immediately understand an error had occoured. Were able to correct after realizing it was an error.

3: Create a 6x6 pool of "deadly goo" anywhere on the map – The user did not immediately understand which actions to perform to complete the task. Had to do some trial and error before being able to complete the task.

4: Save the map – Able to complete the task quickly.

5: Test the map – Able to complete the task quickly.

6: Place a "button" on the map which is connected to the exit. – Able to complete the task quickly.

7: Add "speed gel" to the map, place it in front of the exit – Able to complete the task quickly.

8: Add "companion cube" to the map, place it anywhere on the map – Able to complete the task quickly.

9: Add "bounce gel" – Able to complete the task quickly.

10: Save the map – Able to complete the task quickly.

11: Test the map – Able to complete the task quickly.

C.3 LittleBigPlanet

1: Change background to "needlepoint summer" – Maximum estimated completion time: 4 minutes

2: Change gravity from 100% to 140% – Maximum estimated completion time: 4 minutes

3: Create waves shapes with octagon shape in tree material over the whole platform – Maximum estimated completion time: 8 minutes

4: Select and move part of the wave shape – Maximum estimated completion time: 3 minutes

5: Delete the other half of the wave shape – Maximum estimated completion time: 3 minutes

6: Save the map – Maximum estimated completion time: 1 minute

7: Test the map – Maximum estimated completion time: 1 minute

8: Add a "two-way switch" and place it anywhere on the map – Maximum estimated completion time: 5 minutes

9: Add "bendy rail" and create an s-shape – Maximum estimated completion time: 5 minutes

10: Add "gipsy lamp" and place it anywhere on the map – Maximum estimated completion time: 5 minutes

11: Add "big spikes" and place it anywhere on the map – Maximum estimated completion time: 5 minutes

12: Add "check point" and place it anywhere on the map – Maximum estimated completion time: 5 minutes

13: Add 5 "score bubble" and place it anywhere on the map – Maximum estimated completion time: 5 minutes

14: Create a platform at the inner level and add a bounce pad in front of the platform – Maximum estimated completion time: 5 minutes

15: Make one of the platforms flammable – Maximum estimated completion time: 4 minutes

16: Delete "big spikes" – Maximum estimated completion time: 1 minute

C.3.1 Participant 1 observation notes

19 years old, hardcore gamer, 16/16 task completed

1: Change background to "needlepoint summer" – Able to complete the task, but are not immediately able to locate the right category.

2: Change gravity from 100% to 140% – Able to complete the task quickly.

3: Create waves shapes with octagon shape in tree material over the whole platform – Did not immediately know how to create the platform. Had to look through several menus and try different options before finding the right items, before being able to complete the task.

4: Select and move part of the wave shape – Able to complete the task quickly.

5: Delete the other half of the wave shape – Able to complete the task quickly.

6: Save the map – Able to complete the task quickly.

7: Test the map – Able to complete the task quickly.

8: Add a "two-way switch" and place it anywhere on the map – Able to complete the task quickly.

9: Add "bendy rail" and create an s-shape – Able to complete the task quickly.

10: Add "gipsy lamp" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

11: Add "big spikes" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

12: Add "check point" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

13: Add 5 "score bubble" and place it anywhere on the map – Able to complete the task quickly.

14: Create a platform at the inner level and add a bounce pad in front of the platform – Able to complete the task, but are not immediately able to locate the right category for the item. Struggled to create the platform at the inner level.

15: Make one of the platforms flammable – Able to complete the task quickly.

16: Delete "big spikes" – Able to complete the task quickly.

C.3.2 Participant 2 observation notes

24 years old, core gamer, 14/16 task completed

1: Change background to "needlepoint summer" – Could not locate the correct categorization for game options and were not able to complete the task because of the time limit.

2: Change gravity from 100% to 140% – Could not locate the correct categorization for game options and were not able to complete the task because of the time limit.

3: Create waves shapes with octagon shape in tree material over the whole platform – Did not immediately know how to create the platform. Had to look through several menus and try different options before finding the right items, before being able to complete the task.

4: Select and move part of the wave shape – Able to complete the task quickly.

5: Delete the other half of the wave shape – Able to complete the task quickly.

6: Save the map – Able to complete the task quickly.

7: Test the map – Able to complete the task quickly.

8: Add a "two-way switch" and place it anywhere on the map – Able to complete the task quickly.

9: Add "bendy rail" and create an s-shape – Able to complete the task, but are not immediately able to locate the right category for the item.

10: Add "gipsy lamp" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

11: Add "big spikes" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

12: Add "check point" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

13: Add 5 "score bubble" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

14: Create a platform at the inner level and add a bounce pad in front of the platform – Able to complete the task, but are not immediately able to locate the right category for the item. Struggled to create the platform at the inner level.

15: Make one of the platforms flammable – Able to complete the task quickly.

16: Delete "big spikes" – Able to complete the task quickly.

C.3.3 Participant 3 observation notes

25 years old, casual gamer, 10/16 task completed

1: Change background to "needlepoint summer" – Could not locate the correct categorization for game options and were not able to complete the task before the time limit.

2: Change gravity from 100% to 140% – Could not locate the correct categorization for game options and were not able to complete the task before the time limit.

3: Create waves shapes with octagon shape in tree material over the whole platform – Did not immediately know how to create the platform. Had to look through several menus and try different options and finding the right items. Tried to use some of the options, but were not able to locate the correct option to preform the action. Eventually gave up before the time limit and were very frustrated.

4: Select and move part of the wave shape – Skipped because the participant failed task 3.

5: Delete the other half of the wave shape – Skipped because the participant failed task 3.

6: Save the map – Able to complete the task quickly.

7: Test the map – Able to complete the task quickly.

8: Add a "two-way switch" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

9: Add "bendy rail" and create an s-shape – Able to complete the task, but are not immediately able to locate the right category for the item.

10: Add "gipsy lamp" and place it anywhere on the map – Experienced error when trying to place the item, but were able to place it after trial and error. Did not immediately understand an error had occoured.

11: Add "big spikes" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

12: Add "check point" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

13: Add 5 "score bubble" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

14: Create a platform at the inner level and add a bounce pad in front of the platform – Able to complete the task, but are not immediately able to locate the right category for the item. Struggled to create the platform at the inner level.

15: Make one of the platforms flammable – Able to complete the task quickly.

16: Delete "big spikes" – Able to complete the task quickly.

C.3.4 Participant 4 observation notes

26 years old, casual gamer, 14/16 task completed

1: Change background to "needlepoint summer" – Able to complete the task, but are not immediately able to locate the right category.

2: Change gravity from 100% to 140% – Able to complete the task quickly.

3: Create waves shapes with octagon shape in tree material over the whole platform – Did not immediately know how to create the platform. Had to look through several menus and try different options before finding the right items, before being able to complete the task.

4: Select and move part of the wave shape – Were not able to complete the task within the time limit. The user had tried using different tools and buttons to select part of the shape, but were only able select the whole shape.

5: Delete the other half of the wave shape – Skipped because the participant failed task 4.

6: Save the map – Able to complete the task quickly.

7: Test the map – Able to complete the task quickly.

8: Add a "two-way switch" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

9: Add "bendy rail" and create an s-shape – Able to complete the task, but are not immediately able to locate the right category for the item.

10: Add "gipsy lamp" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

11: Add "big spikes" and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

12: Add "check point" and place it anywhere on the map – Able to complete the task quickly.

13: Add 5 "score bubble" and place it anywhere on the map – Able to complete the task quckly.

14: Create a platform at the inner level and add a bounce pad in front of the platform – Able to complete the task quickly.

15: Make one of the platforms flammable – Able to complete the task quickly.

16: Delete "big spikes" – Able to complete the task quickly.

C.3.5 Participant 5 observation notes

31 years old, core gamer, 15/16 task completed

1: Change background to "needlepoint summer" – Able to complete the task quickly.

2: Change gravity from 100% to 140% – Able to complete the task quickly.

3: Create waves shapes with octagon shape in tree material over the whole platform – Did not immediately know how to create the platform. Had to look through several menus and try different options before finding the right items, before being able to complete the task.

4: Select and move part of the wave shape – Struggled to figure out how to select part of the platform, but were able to complete it eventually.

5: Delete the other half of the wave shape – Able to complete the task quickly.

6: Save the map – Able to complete the task quickly.

7: Test the map – Able to complete the task quickly.

8: Add a "two-way switch" and place it anywhere on the map – Able to complete the task quickly.

9: Add "bendy rail" and create an s-shape – Able to complete the task, but are not immediately able to locate the right category for the item.

10: Add "gipsy lamp" and place it anywhere on the map – Experienced error when trying to place the item, but were able to place it after trial and error. Did not immediately understand an error had occoured.

11: Add "big spikes" and place it anywhere on the map – Able to complete the task quickly.

12: Add "check point" and place it anywhere on the map – Able to complete the task quickly.

13: Add 5 "score bubble" and place it anywhere on the map – Able to complete the task quckly.

14: Create a platform at the inner level and add a bounce pad in front of the platform – Able to complete the task quickly.

15: Make one of the platforms flammable – Able to complete the task, but are not immedately able to locate the right category for the item.

16: Delete "big spikes" – Able to complete the task quickly.

C.4 Trials Fusion

1: Create a start and a finish – Maximum estimated completion time: 3 minutes

2: Add one "uber ramp L" and place it anywhere on the track – Maximum estimated completion time: 5 minutes

3: Move one of the ingame props onto the track – Maximum estimated completion time: 3 minutes

4: Add two "concrete ramp" with different variations and place it anywhere on the track – Maximum estimated completion time: 8 minutes

5: Add one "bomb" and "landmine" and place it on the track after each ramp – Maximum estimated completion time: 8 minutes

6: Add 2 "checkpoints" anywhere on the track – Maximum estimated completion time: 4 minutes

7: Add a large metal container ("metal container L") anywhere on the map – Maximum estimated completion time: 5 minutes

8: Add a bowling ball (item "bowlingball") and place it anywhere on the map – Maximum estimated completion time: 4 minutes

9: Save track – Maximum estimated completion time: 1 minute

10: Test track – Maximum estimated completion time: 1 minute

11: Add a concave steel ramp and place it anywhere on the map – Maximum estimated completion time: 4 minutes

12: Add barbed wire fence and place it anywhere on the track – Maximum estimated completion time: 5 minutes

13: Add a rock pillar and place it anywhere on the track – Maximum estimated completion time: 4 minutes

14: Add a ring of fire and place it anywhere on the track – Maximum estimated completion time: 4 minutes

15: Go back and add a bus and place it anywhere on the map. Create a ramp in front of the bus to jump over – Maximum estimated completion time: 8 minutes

16: Create a loop by using the items which you think is suitable – Maximum estimated completion time: 15 minutes

17: Save track – Maximum estimated completion time: 1 minute

18: Test track – Maximum estimated completion time: 1 minute

C.4.1 Participant 1 observation notes

19 years old, hardcore gamer, 17/18 task completed

1: Create a start and a finish – Able to complete the task quickly.

2: Add one "uber ramp L" and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

3: Move one of the ingame props onto the track – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

4: Add two "concrete ramp" with different variations and place it anywhere on the track Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

5: Add one "bomb" and "landmine" and place it on the track after each ramp – Able to complete the task, but are not immediately able to locate the right category for the item. Are able to place the items in the race track more quicker.

6: Add 2 "checkpoints" anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item.

7: Add a large metal container ("metal container L") anywhere on the map – Able to complete the task quickly.

8: Add a bowling ball (item "bowlingball") and place it anywhere on the map – Able to complete the task quickly.

9: Save track – Able to complete the task quickly.

10: Test track – Able to complete the task quickly.

11: Add a concave steel ramp and place it anywhere on the map – Maximum estimated completion time: 4 minutes

12: Add barbed wire fence and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item. Able to locate a button which immediately connects the item to the race track.

13: Add a rock pillar and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item.

14: Add a ring of fire and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item.

15: Go back and add a bus and place it anywhere on the map. Create a ramp in front of the bus to jump over – Able to complete the task quickly.

16: Create a loop by using the items which you think is suitable – Tried to use several different times, but were not able to create a sufficient loop. Not able to complete the task because of the time limit.

17: Save track – Able to complete the task quickly.

18: Test track – Able to complete the task quickly.

C.4.2 Participant 2 observation notes

24 years old, core gamer, 17/18 task completed

1: Create a start and a finish – Experinced an error because of illegal placement of the finish, but were able to correct the error by reading the game's feedback.

2: Add one "uber ramp L" and place it anywhere on the track – Able to complete the task, but are not immedately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

3: Move one of the ingame props onto the track – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

4: Add two "concrete ramp" with different variations and place it anywhere on the track Able to complete the task, but are not immedately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

5: Add one "bomb" and "landmine" and place it on the track after each ramp – Able to complete the task, but are not immedately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

6: Add 2 "checkpoints" anywhere on the track – Able to complete the task, but are not immedately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

7: Add a large metal container ("metal container L") anywhere on the map – Able to complete the task, but is struggling with camera controls and placing the item at the racing track.

8: Add a bowling ball (item "bowlingball") and place it anywhere on the map – Able to complete the task, but is using less time placing items at the racing track.

9: Save track – Able to complete the task quickly.

10: Test track – Able to complete the task quickly.

11: Add a concave steel ramp and place it anywhere on the map – Able to complete the task, but is using less time placing items at the racing track.

12: Add barbed wire fence and place it anywhere on the track – Able to complete the task, but are not immedately able to locate the right category for the item.

13: Add a rock pillar and place it anywhere on the track – Able to complete the task, but are not immedately able to locate the right category for the item.

14: Add a ring of fire and place it anywhere on the track – Able to complete the task, but are not immedately able to locate the right category for the item.

15: Go back and add a bus and place it anywhere on the map. Create a ramp in front of the bus to jump over – Able to complete the task quickly. More confident using the game controls.

16: Create a loop by using the items which you think is suitable – Tried to use several different times, but were not able to create a sufficient loop. Not able to complete the task because of the time limit.

17: Save track – Able to complete the task quickly.

18: Test track – Able to complete the task quickly.

C.4.3 Participant 3 observation notes

25 years old, causal gamer, 17/18 task completed

1: Create a start and a finish – Able to complete the task quickly.

2: Add one "uber ramp L" and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

3: Move one of the ingame props onto the track – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

4: Add two "concrete ramp" with different variations and place it anywhere on the track Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

5: Add one "bomb" and "landmine" and place it on the track after each ramp – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

6: Add 2 "checkpoints" anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

7: Add a large metal container ("metal container L") anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

8: Add a bowling ball (item "bowlingball") and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

9: Save track – Able to complete the task quickly.

10: Test track – Able to complete the task quickly.

11: Add a concave steel ramp and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track. Got tired of using the editor at this point.

12: Add barbed wire fence and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item. Are able to place the items more quicker in the race track.

13: Add a rock pillar and place it anywhere on the track – Able to complete the task, but are not immedately able to locate the right category for the item.

14: Add a ring of fire and place it anywhere on the track – Able to complete the task.

15: Go back and add a bus and place it anywhere on the map. Create a ramp in front of the bus to jump over – Able to complete the task.

16: Create a loop by using the items which you think is suitable – Tried to use several different times, but were not able to create a sufficient loop. Not able to complete the task because of the time limit.

17: Save track – Able to complete the task quickly.

18: Test track – Able to complete the task quickly.

C.4.4 Participant 4 observation notes

26 years old, causal gamer, 17/18 task completed

1: Create a start and a finish – Able to complete the task quickly.

2: Add one "uber ramp L" and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

3: Move one of the ingame props onto the track – Able to complete the task, but struggling with camera controls and placing the item at the racing track. Were very frustrated by the camera controls.

4: Add two "concrete ramp" with different variations and place it anywhere on the track Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

5: Add one "bomb" and "landmine" and place it on the track after each ramp – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

6: Add 2 "checkpoints" anywhere on the track – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

7: Add a large metal container ("metal container L") anywhere on the map – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

8: Add a bowling ball (item "bowlingball") and place it anywhere on the map – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

9: Save track – Able to complete the task quickly.

10: Test track – Able to complete the task quickly.

11: Add a concave steel ramp and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track.

12: Add barbed wire fence and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item. Are able to place the items more quicker in the race track. Made a comment saying that barbed wire shouldn't be placed under 'city elements' category.

13: Add a rock pillar and place it anywhere on the track – Able to complete the task more quickly, as the user is getting more used to the editor.

14: Add a ring of fire and place it anywhere on the track – Able to complete the task.

15: Go back and add a bus and place it anywhere on the map. Create a ramp in front of the bus to jump over – Able to complete the task.

16: Create a loop by using the items which you think is suitable – Tried to use several different times, but were not able to create a sufficient loop. Not able to complete the task because of the time limit.

17: Save track – Able to complete the task quickly.

18: Test track – Able to complete the task quickly.

31 years old, core gamer, 17/18 task completed

1: Create a start and a finish – Able to complete the task quickly.

2: Add one "uber ramp L" and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item, and struggling with camera controls and placing the item at the racing track. Did immediately not like the camera controls, as it felt unresponsive and difficult to use.

3: Move one of the ingame props onto the track – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

4: Add two "concrete ramp" with different variations and place it anywhere on the track Able to complete the task, but struggling with camera controls and placing the item at the racing track. Made a comment saying the editor was very little user friendly.

5: Add one "bomb" and "landmine" and place it on the track after each ramp – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

6: Add 2 "checkpoints" anywhere on the track – Able to complete the task, but struggling with camera controls and placing the item at the racing track.

7: Add a large metal container ("metal container L") anywhere on the map – Able to complete the task more quickly, and getting used to the camera controls.

8: Add a bowling ball (item "bowlingball") and place it anywhere on the map – Able to complete the task.

9: Save track – Able to complete the task quickly.

10: Test track – Able to complete the task quickly.

11: Add a concave steel ramp and place it anywhere on the map – Able to complete the task, but are not immediately able to locate the right category for the item.

12: Add barbed wire fence and place it anywhere on the track – Able to complete the task, but are not immediately able to locate the right category for the item. Did not understand why the item was located under 'city elements'.

13: Add a rock pillar and place it anywhere on the track – Able to complete the task more quickly, as the user is getting more used to the editor.

14: Add a ring of fire and place it anywhere on the track – Able to complete the task.

15: Go back and add a bus and place it anywhere on the map. Create a ramp in front of the bus to jump over – Able to complete the task quickly.

16: Create a loop by using the items which you think is suitable – Tried to use several different times, but were not able to create a sufficient loop. Not able to complete the task because of the time limit.

17: Save track – Able to complete the task quickly.

18: Test track – Able to complete the task quickly.

D Interviews

D.1 GTA V interviews

D.1.1 Participant 1 interview notes

19 years old, hardcore gamer, 20/20 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

The editor was very easy to use, it was user friendly, and it's easier to place things on an existing map. Nice and userfriendly menu, with lots of help text which explains where you are going and is explaining what to do. Clear feedback on errors when errors ensue.

In general; what did you not like about the game editor?

Wasn't sure how many starting points I had to place, but overall nothing special.

Did you quickly understand where in the menus to look for when asked for an item?

Right away usually.

What did you think of the camera animations/controls when working with the editor?

Went well, was nice, controlled and responsive. Easy to use.

Did you feel it was easy to save and test the level as you were creating it?

A little bit hard to test, but it explained clearly what was wrong before you could test, but had to go through some extra steps. Find the test and save buttons were easy.

Did you feel there were too many or too few options?

Just the right amount I think.

Did the game instruct you on what to do when using the editor?

Yes, it was very easy and intuitive.

Which actions are difficult for new users to understand?

Nothing I think.

Which actions could be removed?

Nothing that I could see

What changes would you make to the editor?

I think it's ok as it is. It gives the user the option to place things on the map, which it did. Maybe have the options to add even more items, but it's easy to use.

D.1.2 Participant 2 interview notes

24 years old, core gamer, 20/20 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

It was pretty easy to use. The game instructions made it clear what to do with the editor.

In general; what did you not like about the game editor?

Nothing special.

Did you quickly understand where in the menus to look for when asked for an item?

Yes

What did you think of the camera animations/controls when working with the editor?

The animations/controls were nice, and the camera was easy to operate.

Did you feel it was easy to save and test the level as you were creating it?

Yes

Did you feel there were too many or too few options?

Just the right amount.

Did the game instruct you on what to do when using the editor?

Yes, the game instructions told me what to do.

Which actions are difficult for new users to understand?

Nothing, I think the editor is easy to use for beginners.

Which actions could be removed?

Can't think of any.

What changes would you make to the editor?

Can't think of anything.

D.1.3 Participant 3 interview notes

25 years old, casual gamer, 20/20 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

It was pretty easy to use. The game instructions made it clear what to do with the editor.

In general; what did you not like about the game editor?

Nothing special.

Did you quickly understand where in the menus to look for when asked for an item?

Yes

What did you think of the camera animations/controls when working with the editor?

The animations/controls were nice, and the camera was easy to operate.

Did you feel it was easy to save and test the level as you were creating it?

Yes

Did you feel there were too many or too few options?

Just the right amount.

Did the game instruct you on what to do when using the editor?

Yes, the game instructions told me what to do.

Which actions are difficult for new users to understand?

Nothing, I think the editor is easy to use for beginners.

Which actions could be removed?

Can't think of any.

What changes would you make to the editor?

Can't think of anything.

D.1.4   Participant 4 interview notes

26 years old, casual gamer, 20/20 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

It was an easy editor to use overall. Not too complex and the editor functions were easy to understand.

In general; what did you not like about the game editor?

I thought the camera controls were somewhat slow and unresponsive.

Did you quickly understand where in the menus to look for when asked for an item?

Mostly, but I had some trouble locating some of the items.

What did you think of the camera animations/controls when working with the editor?

Slow and unresponsive.

Did you feel it was easy to save and test the level as you were creating it?

Yes, it was pretty clear what you had to do to save and test.

Did you feel there were too many or too few options?

It is ok as it is I think.

Did the game instruct you on what to do when using the editor?

Yes, I just had to read what the game said I should do.

Which actions are difficult for new users to understand?

Nothing I think.

Which actions could be removed?

Can't think of anything right now.

What changes would you make to the editor?

Can't think of anything.

D.1.5 Participant 5 interview notes

31 years old, core gamer, 20/20 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

Easy editor to get into if you are interested in creating content I think. But I don't think it was anything special. But it was pretty user friendly.

In general; what did you not like about the game editor?

I can't think of anything, but it was not very exciting or challenging to use.

Did you quickly understand where in the menus to look for when asked for an item?

I had to look and guess sometimes, but overall, I found items pretty quickly.

What did you think of the camera animations/controls when working with the editor?

Camera controls were good.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Could maybe be an option where you could remove some categories you don't use.

Did the game instruct you on what to do when using the editor?

Yes.

Which actions are difficult for new users to understand?

Nothing.

Which actions could be removed?

No.

What changes would you make to the editor?

Remove some categories.

D.2 Portal 2 interviews.

D.2.1 Participant 1 interview notes

19 years old, hardcore gamer, 11/11 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

Fun and easy editor to use. I liked the minimalistic approach to the editor.

In general; what did you not like about the game editor?

Nothing in particular. The editor was overall easy and fun to use.

Did you quickly understand where in the menus to look for when asked for an item?

Yes, I only had one menu to focus on. It made everything much easier.

What did you think of the camera animations/controls when working with the editor?

Great. No problems operating the camera.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Either.

Did the game instruct you on what to do when using the editor?

Could perhaps have some tutorials. Just to show where to start and some simple creations.

Which actions are difficult for new users to understand?

Nothing.

Which actions could be removed?

No.

What changes would you make to the editor?

Nothing I think.

D.2.2 Participant 2 interview notes

24 years old, core gamer, 11/11 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

Very easy and user-friendly editor. I liked the concept of the editor, and it was apprehensible.

In general; what did you not like about the game editor?

Nothing in particular.

Did you quickly understand where in the menus to look for when asked for an item?

Yes, they are located to the left, so finding items is quick.

What did you think of the camera animations/controls when working with the editor?

The camera controls where easy.

Did you feel it was easy to save and test the level as you were creating it?

Yes, that was easy.

Did you feel there were too many or too few options?

Was good as it is.

Did the game instruct you on what to do when using the editor?

Could perhaps have some tutorials. Just to show where to start and some simple creations.

Which actions are difficult for new users to understand?

Nothing in particular. The editor is very straight forward.

Which actions could be removed?

Nothing.

What changes would you make to the editor?

Tutorials.

D.2.3 Participant 3 interview notes

25years old, casual gamer, 11/11 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

Easy and nice design, very few elements to think about. Smooth graphics.

In general; what did you not like about the game editor?

No guide text or instructions. I didn't understand how to expand the room, so it should be some instructions.

Did you quickly understand where in the menus to look for when asked for an item?

Yes.

What did you think of the camera animations/controls when working with the editor?

Very easy with just click-and-drag, as you don't have to think about the camera controls.

Did you feel it was easy to save and test the level as you were creating it?

Very easy and nice.

Did you feel there were too many or too few options?

Perfect amount.

Did the game instruct you on what to do when using the editor?

No, I needed more game instructions.

Which actions are difficult for new users to understand?

How to expand the room, but you can always just try till you figure it out.

Which actions could be removed?

Nothing.

What changes would you make to the editor?

Descriptive text and game instructions. Maybe show some level examples. Tutorial animations/controls for creating the basics.

D.2.4 Participant 4 interview notes

26years old, casual gamer, 11/11 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

The editor was very user friendly, and very simplistic. I liked the editor, and would perhaps try it later if I have time.

In general; what did you not like about the game editor?

Nothing.

Did you quickly understand where in the menus to look for when asked for an item?

Yes.

What did you think of the camera animations/controls when working with the editor?

Yes, the camera were easy and simple to use. I mostly just had to turn the camera around.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Perfect for beginners, as you don't have several menus to think about.

Did the game instruct you on what to do when using the editor?

It was easy to figure out things by trying.

Which actions are difficult for new users to understand?

Nothing.

Which actions could be removed?

Nothing.

What changes would you make to the editor?

Nothing.

D.2.5 Participant 5 interview notes

31 years old, core gamer, 11/11 task completed

Did you understand the tasks given by the facilitator?

Yes

In general; what did you like about the game editor?

The editor was awesome. I liked everything about it. Lucid grid, few and simple functions, good camera controls, easy to edit everything. I would like to try the editor later sometime as well.

In general; what did you not like about the game editor?

Nothing, everything was good.

Did you quickly understand where in the menus to look for when asked for an item?

Yes, it was easy as it is only one menu.

What did you think of the camera animations/controls when working with the editor?

Great. No problems operating the camera.

Did you feel it was easy to save and test the level as you were creating it?

Yes. The "options" had the same layout as a Windows program.

Did you feel there were too many or too few options?

Either.

Did the game instruct you on what to do when using the editor?

It's not that much to instruct. You know where to click.

Which actions are difficult for new users to understand?

I did not immediately understand how to expand the room, and where to click to do it. But once you understand it, everything goes smooth.

Which actions could be removed?

No.

What changes would you make to the editor?

Nothing I think.

D.3 LittleBigPlanet 3 interview notes

D.3.1 Participant 1 interview notes

19 years old, hardcore gamer, 16/16 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

A lot of freedom to create whatever you want, and different options, functions and items.

In general; what did you not like about the game editor?

Categorization of items.

Did you quickly understand where in the menus to look for when asked for an item?

After a while, yes.

What did you think of the camera animations/controls when working with the editor?

Bad, it was not very good. It's pretty unresponsive and lagging.

Did you feel it was easy to save and test the level as you were creating it?

Yes, it was easy.

Did you feel there were too many or too few options?

It was ok, not too many or too few.

Did the game instruct you on what to do when using the editor?

Yes.

Which actions are difficult for new users to understand?

What is game functions and what is decorations. Is a button decoration or a function?

Which actions could be removed?

Remove the chatting and avatar editing in the global menu.

What changes would you make to the editor?

A search function.

D.3.2 Participant 2 interview notes

24 years old, core gamer, 14/16 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

It's a complex editor, which can be good if you want to create something advanced.

In general; what did you not like about the game editor?

Categorization, not understanding all the functions.

Did you quickly understand where in the menus to look for when asked for an item?

No, I had to search.

What did you think of the camera animations/controls when working with the editor?

Weren't the best camera controls.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Could be less.

Did the game instruct you on what to do when using the editor?

No, there wasn't any game instructions.

Which actions are difficult for new users to understand?

Where to locate items.

Which actions could be removed?

Some of the options and menus, perhaps just move them temporarily till you figure out the editor.

What changes would you make to the editor?

Game tutorials and instructions.

D.3.3 Participant 3 interview notes

25 years old, casual gamer, 10/16 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

You are free to do what you want, and that can be good you if you know the tools. There are few restricitons.

In general; what did you not like about the game editor?

Onboarding. Better tutorials to get started.

Did you quickly understand where in the menus to look for when asked for an item?

No, but after a while it got easier.

What did you think of the camera animations/controls when working with the editor?

A little bit slow, and it took some time to use it and know how to control it.

Did you feel it was easy to save and test the level as you were creating it?

Yes, that was not difficult.

Did you feel there were too many or too few options?

Not too much if it were better categorized., and it would be much easier to find what you need.

Did the game instruct you on what to do when using the editor?

No, I got no feedback except "freeze camera" and "place camera", so it was confusing.

Which actions are difficult for new users to understand?

How to start from the beginning, and building basic. I did not really know where to start.

Which actions could be removed?

Some of the options and menus, perhaps just move them temporarily till you figure out the editor.

What changes would you make to the editor?

More hints. Better categorization of menus and items. Better category names as well.

D.3.4 Participant 4 interview notes

26 years old, casual gamer, 14/16 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

You have much freedom and are able to create many different things.

In general; what did you not like about the game editor?

It's hard to use for people who hasn't used it before.

Did you quickly understand where in the menus to look for when asked for an item?

No, I had to look for it through all menus to find specific items.

What did you think of the camera animations/controls when working with the editor?

It was ok, not the best.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Could be less options, or less menus at least.

Did the game instruct you on what to do when using the editor?

There weren't much game instructions, you had to figure out things on your own.

Which actions are difficult for new users to understand?

Where to start, the tutorials wasn't that good.

Which actions could be removed?

Fewer objects and items perhaps.

What changes would you make to the editor?

Some way to search for items.

D.3.5 Participant 5 interview notes

31 years old, core gamer, 15/16 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

I think creating levels can be fun if you are an expert, as you have lots of freedom and functions.

In general; what did you not like about the game editor?

It's hard for people who are not experts, because I did not know where to start. The game instructions and tutorials should be better.

Did you quickly understand where in the menus to look for when asked for an item?

It's easier when you get to know the menus and where to locate items.

What did you think of the camera animations/controls when working with the editor?

A little slow and the camera sometimes just jumped around the screen.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Ok I guess, it's good to have lots of items to choose from if you want to create something advanced and complex.

Did the game instruct you on what to do when using the editor?

There was just some on screen instructions for camera, but there wasn't anything else.

Which actions are difficult for new users to understand?

How to get into the editor can be hard if you are not an expert.

Which actions could be removed?

Can't think of any.

What changes would you make to the editor?

Better categorization of items. Maybe better camera controls as well.

D.4 Trials Fusion interview notes

D.4.1 Participant 1 interview notes

19 years old, hardcore gamer, 17/18 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

Open world where you can choose where to create a track.

In general; what did you not like about the game editor?

Heavy editor to get into, and the controls and placements were not good.

Did you quickly understand where in the menus to look for when asked for an item?

Yes, but some of the menus were greyed out which made it confusing.

What did you think of the camera animations/controls when working with the editor?

Camera controls were very hard to operate, and not very good.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Was just enough.

Did the game instruct you on what to do when using the editor?

No, not really.

Which actions are difficult for new users to understand?

The controls. They were way too hard to use.

Which actions could be removed?

Nothing I can think of.

What changes would you make to the editor?

More user friendly controls, better placing of objects, easier camera controls.

D.4.2 Participant 2 interview notes

24 years old, core gamer, 17/18 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

Not so much, but OK interface. The menus were however ok and easy to navigate.

In general; what did you not like about the game editor?

Camera controls, item placements.

Did you quickly understand where in the menus to look for when asked for an item?

Yes, good categorization.

What did you think of the camera animations/controls when working with the editor?

Slow and unresponsive, not very good.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

It was good, but could be better with fewer options and menus. It would be easier if you have less to think about.

Did the game instruct you on what to do when using the editor?

Yes, to a certain degree. You get the 3D coordinates on the elements so you know how to rotate them.

Which actions are difficult for new users to understand?

Snapping the items and objects to the race track.

Which actions could be removed?

Can't think of any.

What changes would you make to the editor?

Better camera controls, better tutorials, break up the menu and not just have a single line.

D.4.3 Participant 3 interview notes

25 years old, casual gamer, 17/18 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

Seems like you have many different options and items to create whatever you want.

In general; what did you not like about the game editor?

The camera and game controls were horrible. It was very hard to operate the editor. I did not understand all the menu functions, and just had to click and see what they did.

Did you quickly understand where in the menus to look for when asked for an item?

Yes, but I did not know where to locate all the items. The categorization were however good.

What did you think of the camera animations/controls when working with the editor?

Very bad, impossible to work with.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Could perhaps be fewer options, I don't see why I would use all the items and things in the menu.

Did the game instruct you on what to do when using the editor?

The game told me what to do when I got an error. Otherwise the tutorials should be better.

Which actions are difficult for new users to understand?

Placing objects at the right spot, the items got placed high up in the air.

Which actions could be removed?

Nothing I can think of.

What changes would you make to the editor?

Better tutorials, and fix the bad camera operator and horrible item placement.

D.4.4 Participant 4 interview notes

26 years old, casual gamer, 17/18 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

Pretty straight forward editor, and you can create simple things in it.

In general; what did you not like about the game editor?

Horrible camera control, and placing items were also difficult. Lots of menu options.

Did you quickly understand where in the menus to look for when asked for an item?

Yes, the categorization was nice.

What did you think of the camera animations/controls when working with the editor?

Very bad.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Not too few or too many I think.

Did the game instruct you on what to do when using the editor?

No.

Which actions are difficult for new users to understand?

How to control the camera and how to place and edit items.

Which actions could be removed?

Nothing.

What changes would you make to the editor?

Fix the camera first of all. It will make the editor much easier and user friendly.

D.4.5 Participant 5 interview notes

31 years old, core gamer, 17/18 task completed.

Did you understand the tasks given by the facilitator?

Yes.

In general; what did you like about the game editor?

I didn't like it that much, but the categorization of items was good.

In general; what did you not like about the game editor?

The camera, the placement of items. It was also lots of menus, and I didn't understand the functions because of the option names.

Did you quickly understand where in the menus to look for when asked for an item?

Yes, but items like "barbed wire" was hard to find, because I didn't know it would be placed under "city elements".

What did you think of the camera animations/controls when working with the editor?

The camera controls were not good. Hard to work with the editor because of the camera.

Did you feel it was easy to save and test the level as you were creating it?

Yes.

Did you feel there were too many or too few options?

Is ok as it is.

Did the game instruct you on what to do when using the editor?

I didn't see any particular game instructions, except for errors.

Which actions are difficult for new users to understand?

Camera. I did not understand how it was supposed to work.

Which actions could be removed?

Can't think of anything.

What changes would you make to the editor?

Camera, some sort of snapping tool, better menu overview and better tutorials.