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Technical Report LUCI-2012-003
http://luci.ics.uci.edu

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ABSTRACT
Although computer and video games are traditionally understood as interactive experiences designed by professional developers, the increasingly social nature of these interactions means that players often become involved in the design process as well. In particular, games that include developer kits and level editors enable a form of participatory culture in which players directly perform *user-generated game design*—creating their own game rules and challenges for other players—by means of "modding" or other design activities. We explore how players perform user-generated game design by analyzing player-designed levels in the popular game *LittleBigPlanet 2,* using game analysis to consider the design of selected levels and how those levels are presented to and viewed by other players. We describe how players create levels that build on the game's existing genre, but also manipulate this genre to emphasize their own interpretations of what it means to play a video game. This study contributes an initial exploration of a form of end-user design that is of growing importance in video games, with potential implications for the design of future games and other participatory systems.

Author Keywords
Games, user-generated game design, game analysis, genre, modding, situated design

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Design, Human Factors, Performance

INTRODUCTION
Interactions with computer and video games are of increasing interest to the CHI community [5]. In the development model traditionally used by the gaming industry, professional developers create games that are then purchased and experienced by the players. While the developers may modify and patch games based on bug reports, play logs, or even reviews, these games are usually presented as contained and completed experiences created for the user.

Nevertheless, many games include tools and features that enable the *players* to specify elements of their own experience, such as the ability to customize avatars [9] or specify game difficulty. Furthermore, an increasing number of games are being sold with included developer kits or level editors that enable players to modify (known as "modding" in the gaming community) or otherwise create extensions of the existing game. Such editors enable a game-based instance of participatory culture [17,29], in which players develop their own forms of artistic expression and interactive experiences, and then share these experiences with others.

Furthermore, some advanced editors enable players to create their own novel games and challenges *within* the existing game—in effect, enabling players to perform their own informal game design. In this *user-generated game design*, users create their own game rules and challenges for other players to overcome. For example, players may use a level editor to construct new puzzles or obstacles as an extension of the existing game, introduce new game patterns [6], or even use the editing engine as a development platform for entirely new games—all frequently without the benefit for formal software development or design training. Similar to game modding (e.g., [29]), user-generated game design is a form of end-user design [11]—where players perform design during the process of playing. This design process can be highly informative about the desires and attitudes of players towards their play, while also potentially offering valuable opportunities for education (e.g., [27]) and social learning [3].

In this paper, we study user-generated game design as it is performed in the popular PlayStation 3 game, *LittleBigPlanet 2* (*LBP2*). We analyze a selection of the 5.3 million player-created levels [23] in this game (including levels originally created in the first *LittleBigPlanet* but available in *LBP2*) in order to begin exploring how players perform game design as part of playing a game, as well as the relationship between user-created levels and the encompassing game. Based on this analysis, we suggest that players rely on the scaffolding of the *LBP2* format—the conventions and styles that we encapsulate as the "genre" of the game—and situate their design in relation to this established genre. While players typically adhere to this genre in their designs, they can also manipulate the encompassing game's form to emphasize particular elements of the form and styles of game-play, such as those that are perceived as more important to the creator and the community of *LBP2* players as a whole. By examining this form of end-user game design, we contribute to the understanding of how players engage with the design of games, which can inform the development of future games

that solicit and enable user-generated content.

USER-GENERATED GAME DESIGN

Our focus in this paper is on *user-generated game design*. Due to the interactive nature of gaming, players inherently influence both digital and analog games as they are being played, leading to emergent game-play and emergent narratives of game-play [18]. Players choose particular moves to make within a game, and those choices direct the course of what happens during their game-play experience (what obstacles are encountered, how enemies are fought, whether the player wins or loses, etc.). Player effects on game experiences may be particularly influential in multi-player games, where the experience of game-play can be highly dependent on the actions and skills of others.

Yet in influencing and constructing their game experiences, players also may perform implicit or explicit *game design*[1], defining which rules will or will not govern how they play and experience a game. User-generated game design refers to the process of players creating play-inducing rule-sets while playing an encompassing game. As a very simple example of user-generated game design, players may specify "house rules" [15,36] for a game played face-to-face, such as the bet limit on a hand of *Poker* or what characters are allowed in a fighting game such as *Super Smash Bros.*. In specifying house rules, players redesign games to fit their own desires or to conform to a set of community norms about the manner in which a game is played [30]. Indeed, some games make the player design of rules an explicit part of the game: In *Nomic* [31] proposing rules is the primary move of the game, and many tabletop roleplaying games have a "Game Master" who defines and arbitrates rules of play [33]. In these games, the design of the game anticipates and accounts for players performing their own game design, rather than simply accepting an explicit and unmodifiable set of rules as given (even if the experience would be mediated by the players regardless).

A second common form of user-generated game design occurs in games where players create and define *obstacles or challenges* for one another. Suits [32] describes playing a game as "the voluntary attempt to overcome unnecessary obstacles". In this view, the obstacles to be overcome are a defining characteristic of a game—indeed, obstacles are a basic game design pattern [6]. Thus when players design obstacles, they are in fact designing key elements of a game, and in effect are doing game design. Player design of obstacles or challenges occurs in a number of different contexts. These can be explicit challenges to reach a goal with some restriction: in the basketball variant *H.O.R.S.E.*, players challenge one another to sink a basket from a particular location on the court. Players may also implicitly create obstacles, such as through strategic play; setting up a chokepoint in *Warcraft* or *Counter-Strike* could be seen as designing the game that opponents play. (Note that while the user-generated game design of obstacle creation is most common in multi-player games where players design games for others, it is also possible for players to create challenging obstacles for themselves). Here we consider the explicit challenges of player-created levels developed through professional toolkits; in creating these levels, players perform game design by specifying a series of obstacles for other players to attempt.

Player creation of new levels is related to and overlaps with the participatory culture of game modding [10,19,21,29]. "Modding" refers to the end-user modification of computer games, and often involves players accessing and manipulating a game's code and media assets to develop custom maps, scenarios, and even new games. For example, the shooter *Counter-Strike* was originally a mod of *Half-Life* that has since been sold as a stand-alone product [21]. *Defense of the Ancients* (*DotA*) is a mod of *Warcraft III* that helped popularize current forms of the "online battle arena" genre, which include popular games such as *League of Legends*. In this study, we focus on a style of modding that makes use of existing and intentionally designed infrastructures for level creation (such as the map of *DotA*, created using *Warcraft III*'s "World Editor"), rather than the unauthorized modifications of code and assets.

The user-generated game design of level editing and modding is also related to games and virtual worlds that emphasize building and content-creation (e.g., *Minecraft, Second Life*, *Farmville*). In these games, players use existing assets and tools to construct new, in-world objects—usually buildings or structures—often with wide levels of scope and complexity. Such games can include game design activities (and indeed, players have built obstacles and entire game systems within these virtual worlds). However, players of these games often focus on creating artistic representations within the virtual world, rather than the construction of new rules or obstacles that form a game. While the designs of these creations do lead to new interactive experiences, they often lack the quantifiable goals or outcomes that often define a game [28]—we thus see this interaction as primarily one of content design, distinct from the process of user-generated game design. Similarly, we consider machinima [24]—producing animated movies using the game's software and virtual environment—as a form of participatory culture but not user-generated game design *per se* (though such movies are often created with the considered development toolkits).

Any interaction with a play experience can potentially be a form of game design (e.g., if players create unspoken "rules" about how a game is to be played [13]). User-generated game design can cover a wide gradient of activities, from customizations that influence play to explicitly programming new games through end-user development systems. Here we focus on user-generated game design (the process of players creating rules and

[1] We consider game design to be "the intentional creation of rule-sets resulting in play" (adapted from [14]).

obstacles for one another) as it occurs through included development kits and level editors.

In games that include development kits and level editors, players take on the explicit role of game designers. Yet at the same time, they are also continuing to act as players—the process of game design is itself a form of play in these games. Often the "build your own level" component is presented as simply another form of game-play, one that happens to require performing game design. By considering level design as a form of play, we can also draw on previous research in player types and motivation (e.g., [4]) in considering how players perform user-generated game design. For example, some players may act primarily as Explorers (in Bartle's classification [4], players who prefer to discover new areas and hidden elements)—creating levels that push the boundaries of the included editor, or offering up new experiences and areas for others to see. Aspects of a player's primary motivation or type may also influence the game design of player-created levels.

GENRE IN VIDEO GAMES

To date, the topic of genre in video games has been somewhat under-explored [35], with a lack of consensus regarding genre theory and definitions (see [2]). For example, Wolf [37] argues that genre should be based on a game's interactivity (e.g., "the nature of the game's player-character and player control") rather than on its iconography, while Kücklich [20] categorizes games according to their narrativity, their openness (the range of actions a players can choose from), and their interactivity (the frequency of player interaction). Hung [13] also focuses on forms of interaction such as turn structure and players' physical configuration, while pointing out that researchers rarely study the most popular genres (e.g., racing, puzzle, and sports games). Apperly [2] argues for the "messiness" of genres, and suggests that a particular game should be seen as belonging to several genres at once.

Much of this prior research suggests that the purpose of genre classifications is to help developers and players distinguish games from one another. Establishing genres for games helps players to identify the semiotic domains [12] in which they may be acting—a context in which signs are given meaning. For this paper, we use the term "genre" in a broad sense to refer to this semiotic domain. Literacy in a semiotic domain includes the capability to perform a certain form of interaction (e.g., precision jumps in a platforming game or move sequences in a fighting game), but it can also involve recognizing iconography that is emblematic of particular genres or developers. The structure of the game-play interaction combines with particular forms of content presentation to denote particular genres, and these denotations convey meaning to literate players. In our analysis, we consider how player-created levels conform to and deviate from the game's established genre (the format, structure, and appearance of a game)—how user-generated game design exists within a game's semiotic domain.

THE GENRE OF *LITTLEBIGPLANET 2*

Our analysis focuses on the user-generated game design performed in the PlayStation 3 game, *LittleBigPlanet 2* (*LBP2)*. In this game, the player takes control of a customizable Sackboy character, journeying through a variety of game worlds to rescue their "Curators" (i.e., creators) from the Negativitron, which seeks to destroy those worlds. The core game-play of this journey fits primarily into the *platformer* genre [37] (see Figure 1), with the majority of the game-play involving running and jumping to bypass obstacles, hazards, and enemies to reach the end of the level (each level is a section of a world). The platforming interaction takes places in a 2.5D virtual environment, with three depth layers (foreground, middle ground, and background) that the player can transition between to traverse obstacles. For example, the player may run into a dead end in the middle ground, but can jump onto a ledge in the background in order to proceed. The player is also able to manipulate some objects (grabbing, pushing or pulling them), and acquire power-ups that enable them to perform actions such as using a grappling hook to swing across ledges, driving vehicles, or shooting paintballs. However, these abilities are used primarily to supplement the platforming game-play—adding new capabilities for affecting the environment in order to enable forward, spatial progress.

Levels in *LBP2* generally follow a standard narrative and interactive structure: the level begins with an animated cut-scene [7] to establish narrative context and motivation, and then switches to the interactive platforming section. After completing the level, the player is shown another cut-scene to wrap up the narrative, followed by the player's score and ranking among all players who have completed the level. Score is determined by a simultaneous sub-game in the *collecting* genre—most levels in *LBP2* contain a number of "score bubbles" that award points when touched by Sackboy. Touching multiple score bubbles in a row gives the player a point multiplier; thus collecting all the bubbles in a level (and doing so quickly) gives the player the highest score. The game keeps track of every player on the PlayStation Network (PSN) who has completed each level,

Figure 1. In a platforming game like *LBP2*, the player (center) traverses a level while avoiding obstacles through carefully timed and executed movements and jumps.

and ranks them in per-level leader-boards by score. Collecting bubbles is not required for completing the levels, but the score provided by these bubbles provides an incentive for both exploring the level (to collect them all) and for precision movements (to collect them quickly).

LEVEL CREATION IN *LITTLEBIGPLANET 2*

In addition to the "Story Mode" game-play described above, *LBP2* includes a built-in level editor ("Create Mode") that enables players to design and implement their own game levels. Indeed, the ability to create levels is touted as the primary feature of the game: *LBP2*'s website advertises the game as "~~A platform game.~~ A platform for games" [22, strikethrough in original text], showing how the developers present the game's genre as involving content creation rather than just the platforming game-play. Through the Create Mode's level editor, the game's 1.5 million players have created and published more than 5.3 million custom levels at the time of writing [23].

LBP2's robust level creation engine provides players with a number of tools and menus to define interactive objects and structures—such as the Material Changer for selecting the material (e.g., stone, metal, wood) of an object, the Gadget menu for adding springs or pivot bolts, or the Flame Tool for adding a fire hazard. Players can use these connectors and elements to define interactive environments, with platforms that wobble, bend, fall, or harm the player's avatar—common components of platformer games. Players are also able to apply Stickers (images captured, bought, or awarded in game) to objects to help decorate levels. Furthermore, players are able to programmatically define interactions between objects using a visual programming language, enabling interactions from flickering lights, to registering button presses, to complex enemy AI. The level editor also includes a music sequencer for adding custom music and audio effects, as well as cinematic tools that allow for event transitioning and camera movements—the latter enabling the creation of complex machinima.

In entering the Create Mode, each *LBP2* player is given a "Create Moon" to store and organize the levels they create. In this metaphor, the players are creating locations on a particular "moon" (specifically, inside craters that act as level slots), which other players are then able to visit. Players are able to specify a progression of levels or machinima by connecting multiple levels in the same crater—each crater tends to represent a different project. Because of limitations on the amount of interactive elements that players can put into a single level, complex levels may be broken up into multiple parts, each of which is linked along a path through a crater. This moon metaphor links back to the narrative of the game's Story Mode: the player effectively becomes a world Curator, similar to the ones Sackboy is tasked with rescuing. Thus in this metaphor, player creations are given close to equal narrative prominence with the levels included in the Story Mode, and players are directly integrated into the virtual world and narrative of the game, in a manner similar to an Alternate Reality Game [25].

In order to use a particular creation tool or element, the game requires players to watch an in-game video tutorial explaining that tool and its usage. *LBP2* contains 52 level-building tutorials, including instructions for: customizing Sackboy's appearance; placing and editing objects (including sensors, emitters, and connectors that enable the objects to move or react to the player); defining special locations (e.g., start, end, and retry checkpoints); making game-specific elements (e.g., fire pit hazards and "bounce pads" that boost character jumps); adding power-ups (e.g., grappling hooks or water guns); making additional "sackbots" (AI-controlled virtual agents); and controlling the game camera.

Players can create custom logic using the game's built-in visual programming language. This language is based on the metaphor of a "circuit board"—players create circuit boards that contain spatially organized logical elements. Players specify "inputs" to these circuit boards, create branching connecting wires based on the desired logic, and then specify the "output" of that logic. For example, a player can specify a proximity sensor and a switch as the inputs, the flames on a platform as an output, and then add connecting wires and logic switches so that the flames only disappear when the button is pressed (and so allow the player to cross the platform). The visual programming language uses explicit logic gates (e.g., AND, OR, XOR) to connect wires, so that players perform direct computer programming of virtual hardware in designing game levels.

Once a player has designed and implemented a game level, that level can be published online through the PSN for any other *LBP2* player to experience. Players provide details about their levels: evocative level names, descriptions, icons, and creator-specified labels (chosen from a pre-defined list). Details and labels enable other players to search for the level on the PSN (as well as other online listings, such as at lbp.me or on community websites) and choose which levels to play. Reviews are viewable by other players. Combined, these modes of communication enable a player to present a level as a challenge to others, specify the form of that challenge, and receive feedback on the design and appropriateness of that challenge—all in a public format that helps support an active community of player game designers.

METHOD

In this paper, we explore user-generated game design as performed in *LBP2* by performing critical game analysis [8] of select user-created levels. We view these levels as the resulting artifact of the player-performed design, and use qualitative analysis of these artifacts as probes into players' design process. By considering how the level is presented to other players (e.g., summary and introductory material), the interaction and content of the level, and how other players view the level (via reviews), we can gain some insight into

how user-generated game design is positioned within the broader context and community of the game. Because there are currently more than 5.3 millions levels made available in *LBP2* [23], we believe the "depth-first" approach of studying a few select games is more feasible and appropriate for an initial study of the user-generated content in this game.

Choosing Levels for Analysis

To begin exploring the forms of levels created by the community, the authors surveyed and played through over 100 user-made levels. We chose levels either from the list of recently popular, from the list of recently published, from developer and community recommendations lists, and also at random from among all *LBP2* levels. We attempted to try out a variety of levels to get a feel for the selection.

In performing this initial broad survey, we found that a great many published levels are either simple testing experiments, unfinished, or under development. Although the existence of these levels suggests player comfort with releasing half-finished content (and demonstrate the importance of popularity lists), we wished to consider completed game designs in *LBP2*. Thus we focused our exploration on levels recommended by either the developers or the community. *LPB2*'s developer, Media Molecule, periodically picks levels that they wish to showcase, designating these levels as "MmPicks." MmPicks are among the easiest user-made levels in *LBP2* to access, being placed prominently in the menu system and given special highlighting. We also considered levels included in the "Community Spotlight" of the Little Big Planet Central forums (lbpcentral.com)—a popular fan site for the game. Community Spotlight levels are chosen by the editorial staff at LBPCentral (who are not affiliated with Media Molecule) after being detailed and submitted to the forum by the creating player. These levels are then accessible through the Community Spotlight blog, as well as through the Community Spotlight database. At the time of writing there are approximately 165 MmPicks and 1000 Community Spotlight levels.

To choose which levels to use as the basis for our game analysis, we randomly selected 10 levels from each of the MmPicks and the Community Spotlight Archives. This allowed us to sample the levels highlighted by the developers and the community, using them as an initial filter. After playing through these random levels, we selected three levels from this subsample that in our judgment were appropriately demonstrative for this study based on all the levels previously played. The following sections contain in-depth analysis of each of these levels.

FOLLOWING THE GAME'S GENRE

From our informal survey, the bulk of player-created levels in *LBP2* follow the same platformer genre as the game's Story Mode. Levels usually focus on providing some form of themed world for players to run and jump through, with a series of moving platforms to navigate and dangerous hazards to avoid. This platforming game-play is often placed within a narrative context (with a story explaining why Sackboy is traversing these obstacles), and players are able to collect points through score bubbles along the way. Most levels structurally and even thematically resemble the developer-created levels found in Story Mode.

As an example, consider the level *Zhani's Palace: Treasure Hunt*[2] created by player Nilsder94. In *Zhani's Palace*, players make their way through an Arabian Nights themed town, castle, and dungeon (similar to those in the animated movie *Aladdin*, see Figure 2), looking to "find the treasure of the palace of mystery". Indeed, this level is notable in its adherence to the artistic style—even game-specific elements like bounce pads and checkpoints have been customized to match the theme. The use of a specific, recognizable theme in this level matches with the overall style of the game—in *LBP*, levels use the same platforming game-play, but position that platforming in different themed worlds. Thus *Zhani's Palace* matches the conventional model of game design, offering another world for the players to navigate.

Also paralleling the levels in Story Mode, *Zhani's Palace* uses a loose narrative (Sackboy attempts to steal the treasure, is caught by the titular Zhani, and then needs to escape the dungeon) to structure and contextualize the player's navigation of the platforming obstacles. Yet like many other player-created levels, *Zhani's Palace* presents this narrative with written text bubbles, rather than with full cinematic cut-scenes. This form of storytelling can likely be attributed to the complexities of creating machinima in *LBP2*: because players consider cinematic controls a difficult or advanced level-creation technique, many creators find other ways to implement the genre's narrative structure (i.e., introduction, platforming game-play, conclusion) without needing to use the exact media format.

The platforming game-play of *Zhani's Palace* focuses on the use of bounce pads to assist in performing precisely timed jumps to avoid obstacles such as pits of spikes or balls of fire. Interestingly, this level does not make heavy use of *LBP2's* layer transitioning: although the player does move between layers, it usually signals the transition between obstacles or puzzles, rather than being a move taken to overcome an obstacle. The obstacles are instead overcome by using correctly timed jumps that successfully take Sackboy over moving spikes or past rolling flame spheres. Halfway through the level, Sackboy is caught by Zhani and dropped into the dungeon, providing a narrative reason for the player to need to jump and climb higher and higher. In this way, the story's spatial construction of the level also supports the platformer genre—the narrative

[2] http://lbp.me/v/s6cbtq. *Zhani's Palace* was included in LBPCentral's Community Spotlight on 09/05/2010. A play-through of the level (not by the researchers) can be viewed at http://youtu.be/EcOVUkHD4Ss.

Figure 2. *Zhani's Palace* is a player-created platformer with an Arabian Nights theme.

frames the challenge to jump from platform to platform without falling in order to complete the level.

The creator's description of *Zhani's Palace* presents the level as a challenge to other players, directing them to: "Explore Zhani's Palace and try to find the treasure. But take care! Inside of the palace are a lot [of] tricky obstacles." Because "obstacles" in the context of *LBP2* generally refers to "platformer hazards," the level description seems to challenge players to test their platforming skills in overcoming the tricks of this level. In this way, the level is explicitly positioned as an instance of *LBP2's* platformer genre. On the other hand, although the level description suggests that players "explore" the palace, there is actually little exploring to be done. Obstacles are overcome in a linear succession, one after another, with little deviation available so that the player never questions where to go. Yet the fact that players are encouraged to "explore" begins to suggest a common and socially valued play-style held by *LBP2* players.

Indeed, players respond very well to this level as an exemplar of well-designed platformer—more than half of the reviewers labeled the level as "Platformer" along with the author. A number of reviewers remarked on the "smoothness" and "polish" of the platforming game-play, with one admiring how the "all the springboards worked perfectly." This regard for a smoothly working platformer may indicate the difficulty in combining such elements into a final product—having bounce pads, obstacles movements, and required jumps that support a smooth play flow seems to be a desired quality among player-created levels. Thus both the description and the reviews of *Zhani's Palace* begin to indicate how the player community values the execution of the platformer genre.

In sum, *Zhani's Palace* exemplifies the common form of user-generated game design in *LBP2*—in which players create instances of the platformer genre found in the game's Story Mode.

CUSTOMIZING THE GAME'S GENRE

While *LBP2* players generally create levels that conform to the game's normal genre, players are able to manipulate this genre to emphasize particular elements and comment on the genre as a whole. As a game's genre is often "messily" defined [2], a genre may have different aspects that can be given different weights. Within the platformer genre, one level may be focused on timing jumps (as in *Zhani's Palace*), while another may emphasize the puzzle of determining which platform to jump to next. Levels may also bring in alternative genres or sub-genres—a platformer could be combined with an action game or shooter (as in *Tomb Raider*), or also be a "side-scroller" (where the screen automatically moves to one side, as in some levels of *Super Mario Bros.*). In choosing elements to emphasize, players performing user-generated game design can both conform to and deconstruct a particular genre.

Sackrificed[3], by player Morgana25, is one such level that conforms to the platformer genre, but deconstructs and re-emphasizes particular components of that genre. In order to play a custom level in *LBP2*, a player navigates to the author's moon where the level can be selected. Morgana25's moon is densely populated with levels, including multiple MmPicks. This content helps demonstrate the author's degree of experience and expertise at creating levels—Morgana25 has developed significant domain knowledge, which informs the theme of her levels. Furthermore, *Sackrificed*'s level description includes a long list of acknowledgments and thanks, including "everyone who playtested!" This description hints at a form of user-generated game design that begins to resemble professional development, with multiple designers and playtesters collaborating on a game. The thanking explicitly acknowledges Morgana25's membership in a community of creators, all of whom are designing levels.

Indeed, the cinematic cut-scene that introduces this level[4] seems to acknowledge the expanse of the community and the levels designed for *LBP2*. In this cinematic, Sackboy remarks that: "After playing 4 million levels I needed a little rest and relaxation... Take a vacation, they said". Thus *Sackrificed* is situated within the 4 million levels built by the community at the time of the level's creation. The implied player [1] has gone through these many other levels, developing the play competence and the semiotic domain knowledge to understand *LBP2*'s genre. So when Sackboy is captured by islanders and dropped into a volcano as a sacrifice, the player is familiar with the genre of the resulting platformer level (and even expects it, as the level is called a platformer in the description). This introduction suggests that the player may be looking for a

[3] http://lbp.me/v/zwhr7g. *Sackrificed* is an MmPick, and the creator was on the LBPCentral Community Spotlight staff. A play-through of the level (not by the researchers) can be viewed at http://youtu.be/ww3ywKZ9pII.

[4] While this cinematic is technically a separate level, we treat connected levels as a single instance of user-generate game design.

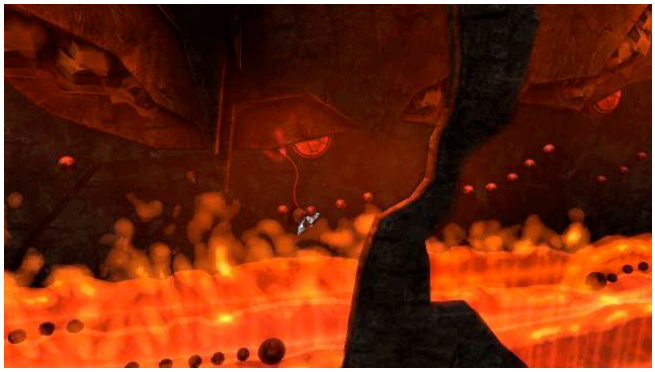

Figure 3. *Sackrificed* uses score bubbles to help locate grapple points for precision swings to cross the lava hazard.

vacation or something different than the normal genre of player-design levels—perhaps implying that *Sackrificed* may offer such a variation. By explicitly referencing the user-generated game design performed in *LBP2, Sackrificed* is positioned as offering a critique of that genre.

The platformer game-play in *Sackrificed* is an excellent example of *LBP2*'s specific genre. Navigating the volcano makes heavy use of layer transitions, with Sackboy leaping to a different layer to avoid a pool of fire, or to scoot behind a lava flow or rock formation. The player must also skillfully use bounce pads and the grappling hook to jump and swing over obstacles. Indeed, some obstacles require the player to swing from one layer to another, or even to locate grappling hook connectors based on the placement of score bubbles (Figure 3). In the final stage of the level, rising lava forces the player to quickly and precisely execute a series of bounces, jumps, and grapples in order to escape and complete the level. Combined, these elements of the user-generated game design indicate how *Sackrificed* is formatted after the *LBP2* genre, reflecting key elements of that genre in the level's design.

But while the game-play in *Sackrificed* shows a highly skillful instantiation of *LBP2's* genre, it also alters that genre in order to emphasize design values held by the creator and community. In particular, *Sackrificed* stresses Exploration as a style of game-play that supports the principle of replayability. The level contains "many secrets to find"—most notably, the player is challenged to collect 15 phoenix eggs (a custom game element) that are hidden throughout the level. In order to find these eggs, players must take the time to explore: they have to follow paths that look like they lead nowhere, duck behind walls, and even replay the level to find an early egg whose location is revealed late in the level. The addition of these secrets gives the platformer genre a greater sense of exploration and collection—beyond simply grabbing score bubbles in order to reach a high score.

In addition to needing to replay the level to collect all the eggs, replayability is further encouraged by granting players a "Fireproof Mode" Sticker upon completing the level. This Sticker allows the player to play the level without being subject to the surrounding fire hazards. In fact, many score bubbles can only be collected while in Fireproof Mode. Thus in order to get a high score in the level (a play value that is reinforced in *LBP2* by displaying the high score continually during play and upon completion), the player has to complete the level multiple times. In this way, the user-generated game design of *Sackrificed* encourages multiple play-throughs by offering varied experiences.

The player response to this level suggests that the community shares the creator's positive valuation of exploration and replayability. Reviews include comments such as "I loved finding all the eggs" and "The fireproof option is brilliant on multiple facets - the foremost being replay, of course." Players seem to intuitively agree that being able to replay a game or level is a good thing, and that including an explicit Explorer-type (after Bartle [4]) challenge improves the level. It's worth noting that *LBP2* itself may be appealing to Explorer-type players, as the game focuses on seeing a wide variety of new worlds and levels (exploring the levels created by others).

Thus by altering *LBP2*'s genre to emphasize the exploration component, as well as explicitly acknowledging the community of creators, *Sackrificed* offers a reflection on the structure and meaning of the encompassing game. It suggests that user-generated game design in *LBP2* involves making new experiences for others—a community of players—to explore, and that the process of community exploration is a valuable part of the genre.

DESIGNING BEYOND THE GENRE

Despite the prevalence of the format, player-created levels in *LBP2* are not limited to the platformer genre. The ability to create custom game objects, interaction logic, and camera movements enables players to design levels that invoke a wide variety of game-play forms. For example, *Little Big Fantasy - Goddess War*[5] (*LBF*), by player X-NOBODY-X, is "an RPG designed for 1 player only." The level is explicitly described as an instance of a different genre, namely Japanese-style roleplaying games where the player assumes the role of a character, often primarily defined by abilities and statistics (see [34]). In particular, *LBF* is "inspired by two of [the author's] all time favorite video games: Final Fantasy/Kingdom Hearts." This level consciously attempts to move beyond the platformer genre and integrate elements of *other* specific games and genres. *LBF* is an example of actively resisting the scaffolding of *LBP2*'s genre (which normally supports the player-generated levels), and instead harnessing the scaffolding of distinct other genres—attempting to recreate these other genres through *LBP2*'s level-editing engine.

[5] http://lbp.me/v/4cnp56. *LittleBigFantasy* is an MmPick, and was included in LBPCentral's Community Spotlight on 08/07/2011. A play-through (not by the researchers) of the level can be viewed at http://youtu.be/RggxBUIJBy8.

Figure 4. Levels can be scaffolded by other game genres, mirroring their interaction and artistic style.

LBF is composed of three levels or "chapters", all of which smoothly link to give the appearance of playing a single game. Similar to *Sackrificed*, the first chapter acts as a primarily cinematic opening cut-scene, though the player moves the character on a straight path from one cinematic event to the next. Indeed, this movement is presented using static camera positions and angles to suggest an isometric 3D environment common to the RPG genre [16], rather than the layered platformer of *LBP2*. In this way, the player-created level positions itself within the visual domain of a particular genre, using that genre as a basis for its design (Figure 4). The second chapter continues to refine the implementation of the RPG genre, introducing a custom menu and turn-based battle system: a mode of interaction in which the player selects a move from a menu (usually an attack), which is then executed through a game animation before the enemy responds in turn. *LBF* thus instantiates the RPG genre in terms of interactivity and artistic design, offering a form of game-play that is based on a different genre than *LBP2*—but is based on an existing game genre nonetheless.

The third and longest chapter of *LBF* in a way reverts back to the platformer mode of interaction supported by *LBP2*, with the player-controlled character running, jumping, sliding, and examining objects and characters. However, this game-play is framed within the overall play structure of the RPG genre. Rather than attempting to navigate past obstacles to reach the end of the level as in a platformer, the player explores an unthreatening environment to interact with non-player characters and develop the in-game narrative (which itself derives from popular RPGs such as *Final Fantasy, Kingdom Hearts,* and *Legend of Zelda*). This game-play includes performing "fetch quests" [26] to transport items from one area of the level to another. *LBF* even includes unique mini-games (sub-games common to the RPG genre) built into the sub-game that is this player-created level in *LBP2*—mini-games that themselves are scaffolded by other familiar gaming genres (see Figure 5).

Yet while the structural and narrative genre of this level is different from its encompassing game, the play-style it supports is the same as many other *LBP2* levels. As with *Sackrificed*, the level encourages Explorer-type game-play: the player explores the environment around them to discover new items, characters, and locations. Indeed, completing *LBF* requires exploring and visiting all parts of the modeled town (to complete all quests): the game design enforces the play-style favored by *LBP2* players, even though the genre of this level differs from other *LBP2* levels. Furthermore, the overall narrative framing resembles that of *LBP2*: the inspiring RPG games involve visiting different "worlds" to find and recover some character or object, just as within the narrative of *LBP2*. In fact, *LBF*'s extensive mythos frames the developer Media Molecule as "The Great Mighty God [who] created everything", thereby linking the RPG narrative to the overall narrative of the encompassing game. Thus although the player-created level deviates from the genre in terms of structure and objective, it does follow from the same play-style and (to an extent) mode of interactivity. *LBF* builds on the pieces that are important values to the player (direct interaction and Explorer-type play), while forgoing genre-base elements that may run counter to this (the platforming gameplay).

Much of the community responses to *LBF* found in the level's comments express amazement at the level's ability to effectively break from the normal platforming genre. Comments such as "I forgot I was playing LBP!" and "Wait that was LBP?" indicate how effectively the creator managed to switch genres, and how the player community may have certain expectations of the genre that scaffolds most player-created levels. Many reviews also acknowledge the amount of effort required to create a level that deviates from the genre's play and aesthetic styles: "Everyone can tell you have put a long time work into this level" [*sic*]. The community perceives a difficulty in existing genre—perhaps because of a strong reliance on the scaffolding of *LBP2*'s genre. Such scaffolding enables level creation, so performing user-generated game design without that scaffolding is seen as extra difficulty.

DISCUSSION

Taken as examples, these three player-created levels demonstrate how user-generated game design is situated within *LBP2*'s platformer genre. The game's genre provides a basis from which players may work and to which they

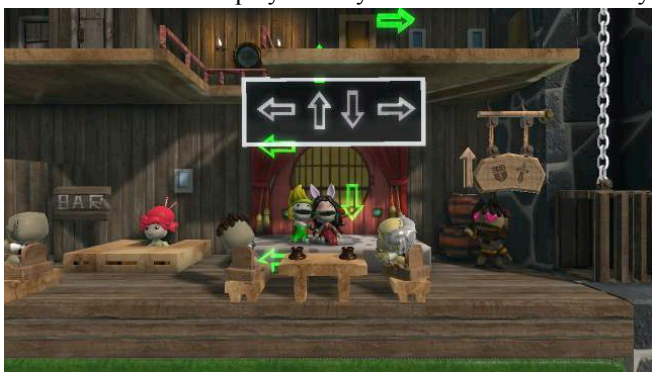

Figure 5. A *Dance Dance Revolution* mini-game indicates how genre is used as scaffolding in user-generated game design.

may adapt. Thus levels such as *Zhani's Palace* extend the level structure established by the game's Story Mode. The lunar metaphor of level creation implicitly suggests that players should build continuations of the previous game—"moons" (as defined by the developers) look a certain way, implying a standard format that players should match. Players may be encouraged to conform to that standard, and design levels within a certain genre (because that genre is what *LBP2* levels look like). Yet at the same time, players are able to manipulate and deconstruct this genre to facilitate particular styles of game-play, such as how *Sackrificed* supports the Explorer play-style by emphasizing collecting and varied replayability. Finally, players can (with effort) deviate from the core genre entirely as in *Little Big Fantasy*, though such user-generated game design is still scaffolded by players' domain knowledge of other gaming genres. Players create levels based on their domain knowledge of game forms and genres, and thus the genre of the encompassing game has a strong influence on and effectively scaffolds user-generated design.

The influence of the encompassing game in particular is likely in part due to the affordances of the game's level editor (as well as being a genre enjoyed by the designing players). Because *LBP2* is a platformer game, the levels its editor is designed to create are also platformers. Thus breaking from the genre requires extra effort to use the provided tools in non-standard ways—making it easier and more effective to design games within the supported genre. Furthermore, the existence of community norms, expectations, and expertise may also encourage conforming to an existing genre. Level-creation in *LBP2* is a significantly collaborative process; players are able to share the levels and models they create, so that others are able to use those elements in the development of new levels. This collaboration is frequently coordinated outside of the game itself, such as through fan forums like LBPCentral. Because the community shares a certain range of expertise and a common set of experiences in a particular genre, it may be easier to establish common ground and collaborate on levels that fit within that format. A full exploration of the collaborative process in user-generated level design, as well as player-motivations for such design, is beyond the scope of this paper and is thus left to future work.

Implications for Design

Although primarily exploratory, this analysis offers a number of potential implications for the design of future games and systems that support player-created content. Players' reliance on existing formats as scaffolding suggests that future games should establish a distinct genre and standard to encourage players to perform game design. While players can and do create games in open sandbox systems such as *Minecraft*, having a set of genre "ground rules" may better enable the production of game levels. Such systems should also be sure to help players establish semiotic domain knowledge of the genre—for example, *LBP2* requires players to complete a few levels in Story Mode before attempting to create their own levels.

Furthermore, games that rely on user-generated content should acknowledge that engaging with a level-creation community often involves Explorer-type game-play. A thriving level ecosystem such as the one in *LBP2* enables players to explore a wide variety of levels and continually see new things and have new experiences; thus Explorers may prefer these games more than other player types. Creating toolsets and genre formats that support Explorers (such as through hidden collectables or forgiving game-play) may better suit the types of players who participate in the process, making for a more enjoyable experience.

Finally much of the admiration for player-created content and user-generated game design occurs when such design deviates from the expected format. Many of the MmPicks seem to be chosen to show off what the level-editing engine can do, from making machinima to implementing entirely new genres. A level-editing system that is robust enough to deviate from established genres and forms, rather than simply enabling players to create more of the same, may be able to better support a diverse ecosystem of user-generated game design.

CONCLUSION AND FUTURE WORK

In this paper we have considered examples of user-generated game design performed in the video game *LittleBigPlanet 2*. We described how these levels are scaffolded by but also deconstruct the format and genre of the encompassing game. This study serves as a initial analysis of this form of participatory culture; further exploration is needed to understand both how and why players perform this game design. In the future, we look to supplement this research with both quantitative analysis of the 5.3 million levels in *LBP2* (to better understand the forms of game design occurring), as well as in-depth user studies of the level creation process.

An understanding of how players perform user-generated game design in this highly popular console game can support future efforts at informal game design in entertainment systems, as well as novel forms of end-user design in domains outside of gaming. Understanding how players' designs interact with existing scaffolding, and why gamers voluntarily devoted the effort to create this ecosystem of player-design levels, can inform the meta-design [11] of future participatory systems. Systems for motivating participation in education, political deliberations, or other pro-social behaviors can all build on techniques that support user-generated game design and encourage user reflection and participation.

ACKNOWLEDGMENTS

The authors thank the Social Code Group, the Donald Bren School of Information and Computer Sciences, and the California Institute for Telecommunications and Information Technology. This work is supported by NSF Grant 0644415 and by the Alfred P. Sloan Foundation.

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