Player Conceptualizations of Creativity in Digital Entertainment Games

Abstract.

Creativity has been widely studied across various disciplines such as psychology and education from a variety of perspectives and has been argued to provide a range of different benefits such as the development of transferrable skills. However, not much is known about how creativity is conceptualized within digital entertainment games from the perspective of the player. In addition to providing a scoping review of the field, this study aims to address current gaps in the literature by answering the research question: how do players conceptualize creativity within digital entertainment games? Data from 24 semi-structured interviews and 14 narrative surveys with regular players of various genres of digital games was analyzed using qualitative methodology. Thematic analysis was performed, resulting in three main categories of conceptualizations: *ways of thinking*, *constructing in games,* and *games as an artform*. By providing an insight into how players view creativity in digital games, this paper aims to illuminate this understudied facet of player experience and pave the way for future studies seeking to explore how digital games may promote creativity in those who play them.

1. Introduction

Previous work has on digital games has focused on creative aspects such as appropriating forms of play (Aarseth, 2007; Consalvo, 2009; Jarrett, 2014, 2016; Sotamaa, 2007), social innovations (Ferguson, 2011; Wright et al., 2002), user created content (Burri, 2011), and affective aspects such as emotional challenge and reflection (Bopp et al., 2018; Mekler et al., 2018) as well as the effects of gameplay on creativity scores using quantitative measures (Blanco-Herrera et al., 2019; Moffat et al., 2017), however, creativity from the perspective of the player has yet to be granted full attention. Not all games are created equal in terms of their scope for creative behavior, and questions remain as to how players of different types of games conceptualize what it means to be creative. As such, this paper aims to address the following research question:

How do players conceptualize creativity within digital entertainment games?

By highlighting the unique ways in which creativity is defined by players of digital games a greater understanding of the player experience may be gained. Identifying the specific aspects of games which contribute to player creativity will provide an initial basis for further investigation into

what players may learn from creativity and, furthermore, what other areas of life such creativity may transfer to. As study aims to extrapolate the different perspectives in how creativity is viewed in games, it may also aid in further work which seeks to illuminate how specific game design elements may scaffold or promote creativity in players. Finally, while it is beyond the scope of this study to extensively investigate instances of creative transfer, findings which emerged concerning this aspect are documented in relation to how creativity is conceptualized from a player's perspective.

1.1 Creativity Defined

Creativity has been investigated across a range of different areas such as work (e.g. Turvey, 2006; Zhou et al., 2014), organizations (e.g. Amabile, 1996b) and education (e.g. Craft, 2008; Lucas, 2001; Rogaten and Moneta, 2016), with findings suggesting many benefits such as positive psychological health and openness (Richards, 2007, 2010). Creativity has also been argued to be highly transferrable, comprising of a variety of skills sought after in the new digital economy (Pellegrino and Hilton, 2012; Ritter and Mostert, 2017) such as critical thinking, problem-solving and cognitive flexibility (i.e. the ability to reactively deal with changing circumstances and opportunities) (Cropley, 1990; Reiter-Palmon et al., 1998). There have been a number of different conceptualizations of creativity such as Big C approaches which focus on works of creative genius and Little C approaches which examine creativity from an everyday perspective. However, such approaches have been criticized for their binary distinction between "genius" and "everyday" creativity, and failing to account for the multitude of creative categories in between (Kaufman and Beghetto, 2009). The Four C Model of creativity (Kaufman and Beghetto, 2009) attempts to bridge this gap by differentiating between four types of creativity: Big C creativity refers to the creative outcomes of those highly competent in their given domain (Csikszentmilhalyi, 1999) and Little C refers to the creative potential of everyone to overcome and solve problems (Maslow, 1968; Richards et al., 1988). In between these two categories are Pro C (Kaufman and Beghetto, 2009) which encapsulates the progression from Little to Big C achievements, and Mini C (Beghetto and Kaufman, 2007) which attempts to explain how individuals are able to construct, adapt and reorganize personal knowledge, leading to personally meaningful insights and affective change. In this way, while Mini C creativity may not be novel to others, the individual involved

is still engaged in a personally creative transformative process leading to developing personal knowledge and insights (Beghetto and Kaufman, 2007).

Other approaches attempt to illuminate creativity from other perspectives such as the Person, Product, Press and Process framework outlined by Rhodes (1961). Creativity from the Person perspective examines how personality traits and factors such as intrinsic motivation facilitate creative behavior (Amabile, 1990; Stohs, 1992). The Press perspective looks at how situational factors influence creativity, most notably autonomy, freedom and resources such as time and encouragement (Amabile and Gryskiewicz, 1989; Witt and Beorkrem, 1989). The Product perspective views creativity as the creation of a product which is both new and valuable; focusing on the outputs and outcomes of creative behavior (Sternberg, 2006; Young, 1985). Finally, the Process perspective examines how creative output is assessed by experts in its given domain and how historical change is driven by ideas which are accepted after a certain amount of time (Csikszentmilhalyi, 1996; Runco, 2004). While examining creativity from a variety of different perspectives helps shed light on how creativity is shaped and defined by a multitude of facets, it does little to illustrate how such factors interact together in the facilitation of creative behavior, or how creativity may occur collectively between individuals (Watson, 2007).

Sawyer and Dezutter (2009) argue that while creativity can occur within an individual it can also occur as a group process. In their theory of Distributed Creativity, creativity occurs when groups collaboratively create a shared product through unconstrained and unpredictable situations (e.g. an improvised performance). Similarly, Empathetic Creativity (Seddon, 2005; Seddon and Biasutti, 2009) has also been used to describe the process of collaborative creativity where individuals are able to transcend their own knowledge bases through the process of decentering where they can gain insight into other group member's perspectives and facilitate the discovery of new thoughts and feelings. Similar to the distributed creativity perspective, improvisation and levels of constraint within an activity play a significant role in the likelihood of empathetic creativity.

Breaking away from external influences on creativity, the creative cognition perspective attempts to explicate the unique processes and mental structures which contribute to creative behavior (Finke et al., 1999). Creative cognition is not solely focused on creativity as a product or a

process, but instead on the types of mental processes which contribute to various stages of creativity and how these processes are combined; namely processes which are involved in cognitive structure generation and discovery and processes involved in the exploration of said structure's implications (Smoliar, 1995). As such creative cognition stresses the importance of domain unspecific creativity, i.e. that such mental processes that contribute to creativity are highly transferrable across different areas of life. The creative cognition framework identifies a range of generative and exploratory processes which contribute to creative ideas and products, such as analogical transfer of information to different domains (Gentner, 1989) and interpretation of possible solutions (Shepard, 1978). Other work involving creative cognition has focused on creative insight which refers to the sudden realization of a solution (e.g. Schooler & Melcher, 1995) and incubation which refers to a period of rest away from the problem (e.g. Hélie & Sun, 2010; Sawyer, 2013).

Finally, the creative cognition perspective also covers work on creative problem-solving which purports that problem-solving is central to creativity, with a "problem representing a gap between where we are or what we have, and a desired location or outcome" (Treffinger et al., 2007: 1). In this light, problem solving can be defined as "the thinking and behaviour we engage in to obtain the desired outcome we seek" (Treffinger et al., 2007: 1). Creative problem-solving frameworks such as the Creative Problem-Solving Model by Treffinger (1995) illustrates how, through a series of processes involving framing problems, generating ideas, developing solutions and reflecting on outcomes, individuals are able to solve ill-structured problems (i.e. problems where there is no clear, single solution).

In essence, creativity can be argued to be a multi-faceted construct involving external influences such as environment and resources, as well as social and individual processes. It does not solely involve creative works of genius, but also the creative potential involved in solving everyday problems, and the personal insights and revelations of individuals. As such, a definition of creativity should involve the formulation of new ideas as well as novel application of old ones, the creation of artefacts and knowledge, and the stretching and altering of mental boundaries in thinking, reasoning and emotions. Hence, creativity does not encompass merely inventing, it also involves altering and integrating. It is fluid and depends as much on the individual as the context in which it takes place.

Problem-solving is often at the heart of big and small creative acts and can serve as a foundation for the discovery of new ideas, methods or viewpoints.

1.2 Creativity Contextualized in Digital Games

Play has been argued to be a creative process in itself, allowing us to approach new and challenging situations in a way which is risk free and encouraging us to experiment with new solutions and approaches that we would otherwise not have attempted (Mainemelis and Ronson, 2006). Through linking abstract concepts to concrete gaming experience, gameplay has been found to aid the development of creativity and problem-solving skills (Leng et al., 2010).

Despite the various benefits of gameplay such as communication, resourcefulness and adaptability (Barr, 2017, 2018) and metacognition and ICT literacy (Sourmelis et al., 2017), there are only a few studies that have primarily focused on creativity and gameplay. For example, Moffat et al. (2017) looked at the effect of different game genres on creativity scores (measured using Torrance Tests of Creative Thinking (TTCT)) and found that gameplay could contribute to a more creative state of mind. A more recent study by Blanco-Herrera et al. (2019) which specifically examined the relationship between creativity (measured using the remote association test (RAT), alien drawing task (ADT) and alternative uses test (AUT)) and gameplay exposure using *Minecraft* (Mojang, 2011) found that there was an overall positive correlation between self-reported gameplay exposure and trait creativity scores, and that creativity scores were highest when participants were not given explicit instructions on what to do in the game. However, while such studies have suggested that digital games can contribute positively to creativity (using common quantitative creativity measures such as TTCT and RAT), it remains unclear as to how players themselves define what it means to be creative in digital games.

One area of creativity involves how players are able to appropriate the gaming experience; for example the distinction between how games are intended to be played and how players actually engage with them. Aarseth (2007) distinguishes between the “implied player” and the “transgressive player”, where the former can be viewed as a blueprint for how a game is expected to be played, including all the requirements which need to be met for the game to be fully realized (e.g. a player

must complete one task before the next becomes available). The latter, however, refers to instances where players are able to do unexpected things which were not intended by the game designer. Such instances of transgressive play allow the player to rebel "against the tyranny of the game…[and] regain their sense of identity and uniqueness through the mechanisms of the game itself" (Aarseth, 2007: 132). For example, cheating has been examined in digital games where many gaming communities incorporate various methods of solving-problems including exploiting bugs and glitches in the game's programming as well as creating shared knowledge of acceptable methods of cheating (Consalvo, 2009; Hamlen and Blumberg, 2015). Similar to Aarseth, Jarret (2014, 2015) who examined co-creativity in *Dota 2* (Valve, 2013), looked at the notion of emergent play where players were able to combine game variables in ways unintended by developers to create powerful new moves. While both transgressive and emergent play are restricted to gameplay, Sotamaa (2007) argues that the concept of transformative play should be used instead as it also applies to the transfer of elements of play from the game world to outside such as in the case of fan creations involving elements of technology in ways not initially intended (e.g. Machinima where animated films are created using game graphics). Transformative play relates to "a special case of play that occurs when the free movement of play alters the more rigid structure in which it takes shape" (Salen & Zimmerman, 2004, p. 324) and can be applied to interpret games as systems which are able to be manipulated, sometimes unexpectedly, by players.

While games can be played in unintended ways, the ill-structured problems that games provide players with have been suggested to be one of the key elements in fostering creativity and intrinsically motivating flow experiences (Kiili, 2005). Killi's (2005) Experiential Gaming Model (EGM) describes problem-solving in games as an experiential processes facilitated by the flow state. Games maintain player motivation and engagement through providing optimal challenges which require the player to engage in two stages of idea generation. The preinvative idea generation stage (Maslow, 1968) concerns creativity which occurs in a chaotic and unstructured manner similar to the play of young children. In the later idea generation stage, the player is able to refine their ideas further in relation to the wider constraints of the game world. Through reflective observations, guided by flow dimensions such as immediate feedback, the player is able to overcome ill-structured problems

through the discovery and creation of novel solutions (Kiili, 2005). While the EGM is fairly general in scope (i.e. the majority of games contain ill-structured problems), it was created to be used in educational game design and hence some elements may not be as applicable to the more informal setting of commercial entertainment games. Specifically looking at commercial entertainment games, Iacovides et al. (2014, 2015) examined the strategies players developed to navigate gameplay breakdowns. Gameplay breakdowns refer to instances where gameplay is interrupted, such as when a player cannot find the correct strategy to progress (Barr et al., 2007). Iacovides and colleagues found that players developed a range of different strategies and coping mechanisms to overcome such instances. These included strategies such as "trial and error" which consisted of the player exploring game boundaries and experimenting and reflecting upon actions, "stop and think" which consisted of taking a short break from play prompting reflection on the problem, and "experiment" where the player uses previous gaming knowledge (often gained from "trial and error") to form an initial hypothesis and then refined the hypothesis based on the outcome (Iacovides et al., 2014, 2015).

While ill-structured challenges in games can provide a means for players to invent and refine strategies, the concept of emotional challenge is applicable to creativity in games from a Mini C perspective (Kaufman and Beghetto, 2009). Bopp et al. (2018) looked at emotional challenge in commercial entertainment games. Emotional challenges often presented players with emotionally difficult themes, leaving parts of the experience ambiguous though good storytelling and writing. Unlike functional challenges, emotional challenges are not tackled with dexterity or skill but with a variety of other competencies such as the capacity for reflecting and making meaning of the emotionally challenging situations presented. Bopp et al. (2018) found that games with difficult themes such as death, illness, war or domestic problems were especially emotionally challenging if aspects of the game narrative mirrored that of participants own lives. Often these themes invoked feelings of negative valence such as anger or loneliness, however, it was noted that "by confronting these difficult themes…participants could derive personally meaningful insights" (Bopp et al., 2018: 9). Even though such experiences invoked negative emotions, players rated the overall emotional experience of such games to be positive and enjoyable (Bopp et al., 2018). In essence, emotional challenges provide players with meaningful experiences which provoked them to examine the

consequences of their actions within the game and allowed them to gain personally meaningful insights (Bopp et al., 2018), something which is in line with Kaufman and Beghetto's concept of Mini C (Kaufman and Beghetto, 2009).

A subsequent study by Mekler et al. (2018) looked at reflection in commercial entertainment games – an aspect which has been argued to constitute a core component of creative thinking (Henriksen, 2006). They found that games could promote reflection in relation to games themselves (i.e. gameplay, game design, gaming practices) and in relation to their parallels to other aspects of life. However, Mekler et al. (2018) found very few instances of transformative reflection (i.e. reflection which caused the player to alter their behavior, gain new insights or reconsider assumptions), however, this may be attributed to the fact that the majority of participants in the study did not play games which focused on prompting reflection outside the context of the game.

From a social innovation standpoint, Wright et al. (2002) found players of the game *Counter Strike* (Valve and Turtle Rock Studios, 2000) created various innovations in verbal and non-verbal expressions such as word plays and borrowing from popular culture. Likewise, in the Schome Park project within the world of *Teen Second Life* (Linden Labs, 2005), Ferguson found teenagers were able to blend and reconfigure ideas and collaboratively to develop the creative vision of their intended project (Ferguson, 2011). Examining creativity in games from a storytelling perspective, Banks (2013) studied how players of World of Warcraft (Blizzard Entertainment, 2004) invented alternate personas and constructed stories relating how their gaming experience may impact upon the behaviors and emotions of these personas (Banks, 2013).

Creativity has also been investigated in the wider context of gaming practice, in relation to the variety of artefacts players create based on games, such as fanfictions, guides, modifications and game art. Burri (2011) defines User Created Content (UCC) as "all forms of expression made by users [which] range from contributions to chats, emails or instant message exchanges, shared links, texts, videos, photographs [and] stories and films" (Burri, 2011: 3). According to Burri, the type of UCC depends on the level of developer-imposed restrictions, for example some games encourage and are defined by UCC (e.g. Minecraft), whereas in others its use is heavily restricted (e.g. World of Warcraft). Papert's constructionism (1980) may be reflected in the expression of creativity through UCC whereby players

actively explore and personalize their gaming experience through the construction of creative artefacts such as modifications, fanfiction and game art. In this way, players are consciously engaged in the construction of creative artefacts which support their personal exploration and expression of the game.

In essence, many aspects of creativity have been examined in relation to commercial entertainment games. The majority of games contain ill-structured challenges which allow players to use imagination and ingenuity to define a variety of different solutions. In addition, to such "built-in" challenges, players may also play with the rules rather than by them – opting to find alternative uses for game mechanics, combine variables in unintended ways and play the game in ways which had never been anticipated by developers. The ability of games to provide players with strong narratives and emotionally challenging themes provoke reflection on a variety of issues, however, whether players associate such challenges and their emotional effects with creativity is still a grey area. Finally, some games also allow players to create, implement and design parts of the gaming experience – from in game objects, to stories, to modifications. However, while each of the works covered in this section highlights aspects of creative behavior, little is still known about whether players actually associate these aspects with creativity, or whether their view of creativity in games is something different entirely. Digital games now "occupy a substantially larger role in media and entertainment cultures" (Bowman et al., 2015) and through studying aspects of player behavior such as creativity, we may gain a greater recognition of the potential impact such aspects may have on the different facets of human experience.

2. Methodology

2.1 Data Collection

Due to the subjective nature of creativity and its dependence on a variety of factors such as past gaming experience, personality and playstyle, an exploratory qualitative approach was adopted. For example, Jarrett (2014) used an ethnographic method to examine emergent play in Multiplayer Online Battle Arena (MOBA) games, while Ferguson (Ferguson, 2011) and Wright et al. (Wright et al., 2002)

analyzed social chat logs. The rich detail such studies provide illuminate the subjective experiences of creativity in digital games by those who play them. In this project, semi-structured interviews were chosen to provide a detailed exploration of the research area. The interview prompts consisted of a series of questions relating to participant's general gaming experience (e.g. engaging gaming experiences they had had recently) and creativity. The creativity questions were divided into three main areas identified from previous literature (i.e. questions relating to affective change from games, questions relating to creative problem-solving and questions relating to appropriation of gaming). Participants were also asked how they would personally describe the creativity involved in games and what elements of creativity they felt transferred most, if any, to other areas of their life. See Table 1 for a full list of interview questions.

Question No.	Literature Area	Question Text
1	General	What games are you currently playing? a. What gaming platforms are you using?
2	General	Can you describe a particularly engaging experience you have had recently whilst playing a game? a. What do you think contributed to making these experiences so engaging?
3	Problem-Solving	Has there ever been a time when you tried out or created a new way of doing something – either on your own or in a team?
4	Affective Change	Have there been any times during your gaming experience when you began to view things in a different way? For instance, when your views were challenged or changed?
5	Problem-Solving	Have you ever "discovered" a new way to go about something or use something in the game? (e.g. something you didn't know was there before)
6	Appropriation	Have you ever used the game mechanics for uses other than what they were intended for? (e.g. glitches, cheats, alternative uses for game variables)
6	Appropriation	Have you ever created anything for the game or based on the game such as modifications, walkthroughs or fanfiction? a. What motivated you to do this?
7	Personal Perspective on Creativity	Do you think you are or can be creative when you play games? a. Do you feel you gain anything in particular from being creative in games? b. Would you use any of the skills/experience from being creative in other aspects of life?

Table 1: Interview Questions

Due to a large number of participants signing up for the interviews, further data was collected in the form of a narrative survey which included a short questionnaire about gaming habits (games currently playing, time spent playing and platforms used) and a set of narrative frames. A narrative survey allows participants to tell stories of their experiences by using various "frames" based on the interview questions (Barkhuizen, 2014). Narrative frames comprise of "a written story template consisting of a series of incomplete sentences and blank spaces of varying length (Barkhuizen, 2014: 402). By providing participants with a skeletal template upon which to write their experiences, a narrative survey allows focused collection of data relating to the research question. Please see Table 2 for the narrative frames.

Frame	Question No.	Prompts
General	Q1b	An engaging experience I have had recently with a digital game was….. a. I found it particularly engaging because…
Problem-Solving	Q2a	A time when I tried out or created a new way of doing something in a game was when…. a. I did this by…
Affective Change	Q2b	A game which changed my views or made me view things differently was… a. This was because…
Problem-Solving	Q2c	A time when I discovered a new way to go about something or use something in the game was….
Appropriation	Q2d	An example of when I have used game mechanics for uses other than they were intended was when…
Appropriation	Q2e	Material I have created for a game/based on a game would include…. a. I was motivated to do this because….
Personal Perspective on Creativity	Q3	I think games are creative – yes/no a. If yes, I think games are creative because… a. When I am creative in games I feel I gain… b. I feel I am able to use the skills/experience gained from being creative in other areas of my life such as… b. If no, I think games are not creative because…

Table 2: Narrative Frames

The use of a narrative survey allowed a further round of data collection within a short period of time. While not providing the same level of detail as interviews, the use of a narrative survey complemented existing data collection methods and aided in the triangulation of data. Triangulation of data was achieved by comparing and contrasting responses across both narrative survey and interview data (Blandford, 2013). It should be noted, however, that a smaller number of participants completed the narrative survey, and hence, the majority of excerpts in this paper are from interview data.

2.2 Participants and Recruitment

Interviews were piloted with four regular players of different types of digital games (male = 2, female = 2, age median: 33). As no significant changes were made to the question list, the pilot data were included in the main analysis. For the main study, participants were recruited via a wider recruitment survey advertised on popular gaming forums, social media and gaming mailing lists. Prior to the interview participants completed a short online gaming habits questionnaire which included questions relating to what games they were currently playing, time spent playing and platforms used. Twenty semi-structured interviews (male = 14, female = 6, age median = 28.5) were conducted with regular players of various different types of digital games, both online and offline. Interviews were conducted over Skype and lasted between 10 minutes and 1 hour, with the average interview session lasting 39 minutes. In addition, 14 participants completed the narrative survey (male = 7, female = 7, age median = 31.5). The survey was administered online and participants completed it at a time of their choosing.

The median gaming session (i.e. the amount of time spent playing digital games in one sitting) for interview participants was 3 hours (M = 3.55, SD = 2.78), while for narrative survey participants, this was 1.86 hours (M = 2.36, SD = 1.13). Participants were from a range of nationalities (e.g. British, American, German) and played a variety of game genres, both offline and online. The most commonly played offline genres were action/adventure (n = 28), role-playing (n = 24) and strategy/tactics (n = 19) and the most commonly played online game genres were first person shooter (n = 16), massively

multiplayer online role playing games (MMORPG) (n = 15) and multiplayer online battle arena (MOBA) (n = 13).

2.3 Analysis

Thematic analysis following Braun and Clarke's (2006) guidelines was conducted to identify the different viewpoints surrounding how creativity was defined by players of digital games. Thematic analysis serves as a "method for identifying, analyzing, and reporting patterns (themes) within data. It organizes and describes a data set in (rich) detail" (Braun and Clarke, 2006: 6). Themes attempt to crystalize something important within the data in relation to the research question and represent a pattern of meaning within the data set. As there was no existing research relating to how players conceptualized creativity, an inductive approach to theme development was deployed. Themes were identified across the whole data set (24 interviews and 14 narrative surveys).

The overall theme of Player Conceptualizations of Creativity was developed, consisting of several sub-themes relating to how participants described creativity in games. Upon development of the first set of themes, the theme framework was discussed and cross-checked by three colleagues for consistency. A further three iterations of theme development were performed with themes being cross-checked on each iteration. See Table 1 for theme descriptors.

Sub-Themes	**Description**
Ways of Thinking	Creativity in games is conceptualized as the creative ways of thinking games promote.
Constructing in Games	In this conceptualization, creativity in games was viewed as the creation of actual game content such as building castles in Minecraft or creating levels using included level editors.
Games as an Artform	Creativity in relation to games is viewed mainly from the standpoint of the developers. In this way games are viewed in a similar light to other creative mediums such as film and writing and require a similar level of creative input from developers.

Table 3. Player Conceptualizations of Creativity Theme Descriptors

3. Findings

Within the overall theme of Player Conceptualizations of Creativity, three sub-themes were identified relating to the unique ways in which players described what it meant for them to be creative in games relating to *Ways of thinking, Constructing in Games* and *Games as an Artform.*

3.1 Ways of Thinking

The most common view on creativity in digital games that participants referred to was ways of thinking, which referred to the specific thinking and thought patterns which games prompted. This theme was referenced across a wide variety of games, although was mostly used in relation to games in general rather than a specific title. One such way of thinking involved creative problem-solving, as described by one participant:

"In some senses they are a blank canvas. The best games will present you with a puzzle or a problem that you have to solve yourself, within the confines of the game mechanics. Working out the limits of what you can and can't do is one of the most fun aspects of picking up a new game." – Male, 29 (Narrative Survey)

Participants who referenced this viewpoint also noted aspects of appropriation such as how games encouraged players to test the boundaries of what the game mechanics would allow. This included the creativity involved in locating glitches, exploits and finding new uses for existing game mechanics. However, as another participant illustrated this was noted to be more difficult in newer games which were more polished upon release.

"Generally more like early in development games are good because they have a lot of bugs and such that are not intended. So you can use them to your advantage in creative ways." – Female, 21 (Interview)

Additionally, several participants also mentioned speedrunning, where an entirely new goal for the game is created. Instead of playing the game in the way the developer intended (i.e. to go through the normal progression route, level up, etc), speedrunning usually involves trying to complete the game in the shortest time possible using skill, shortcuts and glitches. However, as one participant noted while speedrunning a game involved constant refinement to improve, it also involved doing "the same thing over and over, resetting the game hundreds of time to try and get the perfect run" (male, 27, interview). In this way, while some players may feel motivated to engage in game-based creative practices such as speedrunning and are prepared to dedicate a significant amount of time to achieving the "perfect run", others may find the monotony of repeated actions to be a demotivating factor for engaging in this type of creativity.

The other way in which participants noted how games facilitated creative thinking was in terms of changing perceptions, views and attitudes in everyday life. This often involved the particular thinking patterns which games required (e.g. considering alternatives) being transferred to apply to real life problems, such as the case of one participant who noted how games helped him in his job as an Uber driver:

"Using Uber, you know, the App is awful because it takes you straight through traffic because it just tries to find the simplest road…when I pick up other riders, they'll be like oh man, I'm so glad you went around the traffic because usually most people just follow the App. It's kind of odd that doing a thing as simple as playing a video game, if you do it with the right mindset, can keep you open minded and flexible." – Male, 36 (Interview)

By using the flexible and adaptable mindset developed from playing digital games, the participant was able to transfer these skills to a real-life setting: in this case, looking for alternative routes through traffic and not solely following the directions he had been given.

Other participants mentioned that games had provoked them to consider moral, cultural and existential issues. Usually participants referenced such instances in relation to games with strong

and/or choice-based narratives. As one participant illustrated in reference to *Fallout 4* (Bethesda Game Studios, 2015):

"This really called into question the concept of humanity. The whole game theorises the idea of whether synthetics and 'zombies' can be seen as human and this really questioned my ideologies on what makes someone human." - Female, 30 (Narrative Survey)

In this way, while games may lend themselves to creativity in in terms of the thinking patterns involved in problem-solving and appropriation, the narrative of a game may also facilitate creativity from a more personal perspective in terms of challenging a player's viewpoints and providing a basis for reflection on wider issues.

Finally, many participants expressed the view that being creative in games facilitated creativity in other areas of life, with one participant describing creativity "kind of like a muscle: the more you use it, the better you'll get at it" (male, 21, interview). However, it is worth noting that the majority of participants in the study also engaged in other creative pursuits. As one participant noted:

"I think creativity begets creativity. When you see and have invested in something creative, that influences the creativity that comes from yourself as well. So I like writing, I like music, so playing music, things like that. And with the writing, it's easy to kind of say you see interesting storytelling, you might pick up elements of it to incorporate into your own stuff. But even with playing music, if you're seeing something done in an unusual way, you start thinking about things you're doing in a more unusual way." – Male, 26 (Interview)

Ways of thinking was referenced across a range of different game genres (online and offline) suggesting a more generalized conceptualization of player creativity that is not necessarily confined to any particular type of game.

3.2 Constructing in Games

Within the theme of constructing in games, creativity was conceptualized in terms of creating game content. This was usually referenced in relation to sandbox style games such as *Minecraft* (Mojang, 2011) and *Kerbal Space Program* (Squad, 2015). The majority of participants referred to how the freedom afforded to the player in such games allowed them to create anything they wanted.

"Sandbox games like Minecraft can be very creative because they are open-ended and leave plenty of scope for the player." – Female, 58 (Narrative Survey)

Some participants mentioned that they put a significant amount of planning and thought into their creations and got a "sense of achievement" when their creations worked out well (female, 31, interview). In addition to the creation of in-game objects and structures, one participant also mentioned being able to choose different outfits.

"Whereas now you can choose different outfits, you can become creative. So creativity and innovation has played a large importance in some of the games on the platforms – which has made it more interesting for myself because I've played them and I just feel yeah like there's a selection of different selections to choose and it makes it more enjoyable." – Male, 29 (Interview)

Several participants also talked about creating levels and maps using integrated level editors as a way to try out game design and "improve on what's available" (male, 54, narrative survey), although they hadn't spent a great deal of time on these activities and it was more for "fun" (male, 34, interview). Additionally, while a significant number of participants mentioning using mods (modifications which add custom items, levels, characters, objects and interfaces) created by others to add further functionality or items to their games, some participants mentioned creating such mods themselves using in-game mod editors and toolboxes. One participant stated how he enjoyed adding mods to *Minecraft* (Mojang, 2011) which turned building things into an automated process:

"I enjoy modding it, so adding things that weren't in there originally. And I am fascinated by automation systems, so I'll have mods that allow me to instead of building my own stuff, I'll start a factory that will build the stuff for me. And I don't really care about the end result. I like the idea of building a system and then making it more efficient and all that sort of thing. And I found a way in one modification that added solar power. I managed to break it slightly and instead of using solar panels, I managed to create my own sun." – Male, 26 (Interview)

While ways of thinking sometimes involved the transfer of game-based cognitive skills to instances in real life, in constructing in games participants referenced the transfer of creativity from real life to the game. This was largely seen in instances where participants had used sandbox games to construct real life objects or environments, such as one participant (male, 33, narrative survey) who created a city within a topographically accurate map of Mars in the game *Cities: Skylines* (Colossal Order Ltd., 2015). However, it was also referenced in relation to using games to create stories or drawings as one participant put:

"The other direction of creativity, more on the artistic way, creating your own stories about it, and writing them down, or creating your own drawings." – Male, 34 (Interview)

Finally, one participant highlighted the distinction between playing and creativity; with creativity usually being associated with making things. However, upon further considering the difference, he points out that the boundaries between play and creativity are blurred:

"It's strange. Examining it kind of critically after the event I would say yes, but when I'm actually doing it, I would say no, because to me creating is making something, whereas, there's a difference between playing and creating, but then if you sort of look at that statement and go well, where's the line, where are you playing and where are you creating, there is a really big grey area in the middle. So I personally wouldn't regard myself as very creative but I think that I'm incorrect in my belief in some ways, after having sort of looked at it." - Male, 41 (Interview)

3.3 Games as an Artform

While both ways of thinking and constructing in games were concerned with creativity involving the player, games as an artform was largely viewed from a developer standpoint. Similar to the level of creativity which goes into other forms of media, participants viewed games as a creative medium in and of itself. In this respect, creativity was largely down to those who designed and developed the games. As two participants illustrated:

"They take skill to write and create. Games have stories just like movies or books. They require a similar level of directing." – Female, 21 (Narrative Survey)

"I think from a designer's standpoint if someone is designing games then yeah, I think they, people are trying to break the mould all the time. Like you've now got VR and people can really immerse into games. I suppose they've been creative from the get go." – Female, 29 (Interview)

While the majority of references in games as an artform were concerned with creativity from the developer's side, some participants also mentioned that games required creative input from both developers and players.

"Video games are definitely an outlet for creativity as far as I'm concerned both like making and playing. I'm very much in the camp that video games are an art form." – Male, 23 (Interview)

"Good games always challenge you. They want you to find solutions to problems, which is usually a chore, but games manage to make it interesting. They also tell great stories and widen your perceptions of the world. Without a creative approach, both in the development of the games and the interaction from users, that would not be possible." – Male, 27 (Narrative Survey)

In essence, participants viewed games in a similar fashion to other forms of creative media, however, it was also noted that the creativity was not solely one sided, with games requiring creative input from both developers and those who played them.

4. Discussion

The majority of participants explicitly indicated that they thought games involved creativity in some form, with many citing multiple viewpoints, suggesting that each conceptualization may point to a different facet of player experience.

With respect to *ways of thinking*, creativity was conceptualized as the creation of novel solutions to problems and challenges, with participants citing that games allowed them to make choices, experiment and discover aspects of the game and encouraged them to "think outside the box". The instances referenced in ways of thinking were synonymous with previous work on emergent (Jarrett, 2014, 2015), transgressive (Aarseth, 2007) and transformative (Sotamaa, 2007) forms of play as well as creative problem-solving (Kiili, 2005; Leng et al., 2010). Especially in the instances of playing the game in unintended ways or using glitches, participants were able to create new structures and challenges within the games which were not foreseen by developers. Many participants also mentioned that they actively tried to find bugs within the games they played, suggesting that they intentionally went into the game with a creative mindset; viewing the game as a puzzle which they had to unpick. However, as one participant noted with reference to speedrunning, playing in such a way could become repetitious in the drive for improvement and recognition within the wider speedrunning community, highlighting a move towards more professional creative engagement. Such an approach is more in line with Pro C (Kaufman and Beghetto, 2009) where the game is no longer solely intended to be "played" but instead used as a more dedicated form of creative engagement which is subsequently recognized within the wider gaming community. However, while some players may be motivated to engage in such creative endeavors, others may find the repetitious gameplay a demotivating factor.

Ways of thinking could also be synonymous with the view of Little C creativity. Creativity can be applied in an effort to overcome and solve everyday problems and approaches such as Richards'

(2007) “everyday” creativity argue that everyone has creative ability to some extent, and this ability can be developed further. In this regard, games act as the medium upon which this type of creativity can be cultivated through providing players with various ill-structured challenges which require creative thought to be overcome.

Furthermore, the ability of games to alter players’ worldview and ways of thinking about everyday problems could be seen as a type of affective change, synonymous with the Mini C approach (Kaufman and Beghetto, 2009). In this way, creativity in games is conceptualized in terms of the novel and personally meaningful interpretation of the gaming experience, and how this interpretation transfers to other aspects of life such as viewing problems in everyday life or altering one’s perception of something. Many participants referenced the ways that games had made them think and reflect on moral, cultural and existential issues. While reflection was not the focus of the current study, instances of reflection were observed when participants spoke of the effect games have had on their perceptions, views and attitudes, especially in cases where aspects of the game narrative related to their own lives. The majority of participants referred to instances where games had affected them emotionally or provoked them to think about matters they otherwise wouldn’t have – something which both supports previous work that emotional challenge is an important part of the player experience (Bopp et al., 2018), and that players associate the emotional effects of such challenges with creativity in a Mini C sense.

The link between creativity in games and creativity in other areas of life was another important aspect highlighted in *ways of thinking* with many participants indicating that they felt games facilitated creativity outside of games, with instances cited involving incorporating aspects of the game into writing, music and drawing. These findings support the argument that creativity is highly transferrable (Pellegrino and Hilton, 2012; Ritter and Mostert, 2017) and constitutes a variety of domain unspecific skills such as critical thinking and problem-solving (Carvalho et al., 2015; Mayer, 1989) and cognitive flexibility (Cropley, 1990; Reiter-Palmon et al., 1998). For example, the participant who mentions that games have helped him adapt to different traffic situations and seek alternative routes may lend support to the claim that digital games enhance cognitive flexibility (Blanco-Herrera et al., 2019; Moffat et al., 2017). The creative cognition perspective may shed light on how such

creativity is transferred between domains, with participants citing they gained ideas and inspiration from the games they played. Games allow players the opportunity to experiment and test out ideas in the preinvative stage of idea generation and then refine and reflect upon them in an idea generation phase. While in the EGM model (Kiili, 2005) the idea generation stage solely relates to ideas which are refined and realized *within* the game, it could be that such ideas are tested within the game and then realized *outside* of it.

Within *constructing in games*, creativity was conceptualized in terms of the creation of game content and modifications. Referencing Burri's (2011) levels of UCC, this viewpoint is aligned with games which fall under the category with the greatest scope for UCC (i.e. sandbox style games). In games such as these, players are able to shape, define and personalize most aspects of the game as well as share created content with other players. This viewpoint can be likened to the conceptualization of creativity as a product where players are able to produce something which is personally novel and appropriate (Ochse, 1990; Sternberg, 2006). In addition, several players mentioned that they preferred games where they could implement or create mods. This allowed them to add additional features and personalize their gaming experience further, once again suggesting that games which have the greatest scope for UCC provide players with opportunities for this type of creative behavior. This could be further illuminating by Papert's (1980) notion of constructivism in which ideas are realized and transformed when expressed using different forms of media within particular contexts (Papert and Harel, 1991) and in this way "learners invent for themselves the tools and mediations which support the exploration of what they most care about" (Ackermann, 2001: 4). In this case, players can form ideas and inspiration from digital games, which they are then able to realize in the creation of different types of UCC such as implementing modifications to augment their gameplay experience, or through the creation of UCC around the game such as stories and game art.

While the majority of participants mentioned creating in-game objects in sandbox style games, those who referenced using level editors spoke of a more explorative approach to game-based creativity, focusing more on fun instead of the more serious planning and forethought which goes into a larger creative project. It has been argued that the difference between play and creativity is that play encompasses a set of behaviors, whereas creativity involves a distinctive process (Stebbins, 2015).

In the former, play encompasses both physical behaviors (i.e. to physically play with an object), and mental behaviors "as seen most vividly in the creative, innovative manipulation, both conscious and semiconscious, of certain ideational elements leading thereby to new constructs of immense variation" (Stebbins, 2015: 135). In the latter, cognitive structures and traits combine to form the creative process. The examples where participants spoke about using level editors in a non-serious "fun" way could be related more to an initial, explorative play state. It has been suggested that play promotes combinatorial flexibility, the opportunity to recombine existing behaviors and combine ideas in novel ways which initially may not seem entirely useful (Amabile, 1996a; Weick, 1979). In this way, the non-serious explorative play could act as the building blocks for further creative action within or outside of the game. Games which provide built-in features such as level editors could be argued to support this type of creativity by providing players with the opportunity to pursue their curiosity and explore elements of game design and development.

The third conceptualization of creativity, *games as an artform*, was cited in relation to the development and design of digital games. The view that games are art is becoming more widely accepted with many games now being enshrined as art forms in their own right (Bogost, 2011: 10; Clarke and Mitchell, 2007; Smithsonian Institute, 2012). This conceptualization is more in line with Big C approaches which view creativity as the creative outcomes of someone who is highly competent in their given domain such as Nobel prize winners, great authors or famous artists who have all mastered skills in their particular domain (Csikszentmihalyi, 1996). In this way, games were viewed in line with other creative works such as artwork and films. The contrast between creative works of players within or around the game, versus the creative works of the game developers hints at a distinction between "amateur" and "professional" creative labor. While the word "amateur" has been given negative connotations, its original meaning originates from the Latin word "amator" meaning "lover" and portrays a creator who produces primarily because they enjoy the act of producing something in and of itself (Lastowka, 2012). In this way, players who referenced instances in the constructing in games category referenced works of amateur creative labor (e.g. creating levels and objects using built-in editors) in that they were engaged intrinsically; for their own enjoyment and as an exploration of their creative abilities. Inversely, the conceptualization of games as an artform hints at Big C creativity and

subsequently professional creative labor. Conversely, professional creative labor has commercial value and is packaged and sold within the industry – in this case, the games industry (Lastowka, 2012).

While the majority of references in *games as an artform* suggested that creativity occurs on the developer's side, a few participants did mention that games require creativity from both developers and players. It has been suggested that digital games are examples of co-authorship between developers and players, requiring input from both in order to be fully finished products (Bowman et al., 2015). Examples of this could be illustrated by instances where developers have incorporated player modifications into their games or created new products inspired by things players have created – such as the MOBA game *Defense of the Ancients (DoTA)* (Eul et al., 2003) which was originally created as a modification by players for the game *Warcraft III* (Blizzard Entertainment, 2002). *DoTA* defined the MOBA genre in gaming and eventually, the developer Riot Games, along with several prominent community members involved with the creation of *DoTA* went on to release the commercialized *League of Legends* in 2009 (Jarrett, 2016). Without the ingenuity of the player base that created the original modification for *Warcraft III* these games would not have been developed. In this way, digital games as creative products are not solely realised from the interaction between the implied player and the game (Aarseth, 2007), but also through other appropriative forms of engagement such as player created modifications and content (Jarrett, 2014, 2015; Sotamaa, 2007).

5. Implications

The implications of this study are threefold. Firstly, the findings contribute to the currently understudied area of creativity in digital entertainment games. While previous studies have focused on certain aspects of creativity in this context e.g., problem-solving and appropriation (Jarrett, 2015; Kiili, 2005), little is known about how creativity is viewed from the perspective of the player. This study identified three unique player viewpoints with respect to how creativity is conceptualized in digital games.

Secondly, the benefit of games in terms of learning has been well documented (Barr, 2018; Sourmelis et al., 2017). Through providing an initial insight into the aspects of digital games which

players define as creative this study forms the basis for future research to further investigate player experience surrounding creativity and what specific skills may be developed from being creative in games. Furthermore, the study highlighted that players felt that being creative in games helped facilitate their creativity elsewhere in life – a finding which is in line with the argument that creativity is transferrable and domain unspecific. It has been argued that education should focus on transferrable skills such as creativity, where several frameworks have been developed which aim to define transferrable skills for the new digital economy such as the 21st Century Learning Framework (Partnership for 21st Century Skills, 2019), Knowledge Age Skills Framework (Clough and Ferguson, 2010) and the European Commission's Digital Competence Framework (Kluzer et al., 2018). While the transfer of creativity between games and real life was not the main focus of this study, the findings nevertheless highlights some important points concerning the use of games to develop transferrable creativity – namely that being creative in games can act as a building block for further creative action outside of games.

Finally, the findings may provide a basis for future studies within the wider area of game design – both within an entertainment and educational contexts. The focus on what players define as creative may provide insight into how games and related technologies can be developed with creativity in mind. For example, allowing players to be part of the game design process may promote a sense of creative co-authorship between players and developers, or through providing integrated map and level editors with games, players can try their hand at game development themselves.

6. Limitations and Recommendations for Future Work

Given the exploratory nature of the study, there are some limitations to note. Firstly, it has been suggested that creative individuals are more likely to engage in digital gaming activities, and as a result, their creativity may be enhanced (Jackson, 2012; Jackson et al., 2012; Ott and Pozzi, 2012). The majority of those who participated in this study were already engaged in other creative activities outside of games such as writing or creating music, which could have had an impact on how they perceived and conceptualized creativity in digital games. As such, a comparative study between

gamers who are already see themselves as “creative” and those who do not engage in any other creative hobbies would be beneficial in determining how perceptions of creativity differ. In addition, a comparison between gamers and non-gamers would further aid in determining how conceptualizations of creativity may differ between the two groups.

Secondly, this study reports on the findings from a total of 38 participants and, hence, conclusions cannot be generalized to a wider population of players. It has been argued that qualitative research should aim to gather data from at least 30 participants due to the “central limit theorem” where the greater the number of cases, the more generalizable the results (Mayring, 2007). By using two methods of data collection in the form of semi-structured interviews and a narrative survey, triangulation of data was possible as the findings from each method could be compared and contrasted. However, while themes were cross checked by three colleagues, the use of multiple coders to provide “intersubjective consensus” (Blandford, 2013: 11) could provide a further level of external validation in subsequent qualitative studies.

A logical next stage in the project would be to build on current findings by delving further into the possible relationship between the different forms of creativity in games and what specific skills may be developed from them, and in what other areas of life these skills may be used. Furthermore, generalization of findings could be assisted through the use of a wide scale quantitative survey on creativity and gaming.

7. Conclusions

The aim of this paper was to provide an insight into how players of digital games conceptualized creativity. Semi-structured interviews and a narrative survey were used to collect data from 38 participants. Those who took part were regular gamers, played a variety of different digital game genres, both online and offline, and were from a range of different nationalities. Thematic analysis was performed on the data using an inductive approach to theme development.

Three main distinct conceptualizations of creativity emerged: *ways of thinking*, *constructing in games* and *games as an artform*. Each aligned itself towards a different aspect of creativity: *ways*

of thinking incorporated creative problem-solving, "everyday" Little C creativity and the novel and personally meaningful interpretations of the gaming experience synonymous with the Mini C definition. In contrast, *constructing in games* highlighted creativity from a product perspective, whereby players are able to create something which is both novel and appropriate. The theme also highlighted the distinction between an initial exploratory play state in terms of participants "trying out" game design with level editors, and a more "serious" creative state where participants planned what they wanted to create in sandbox style games. Additionally, *games as an artform* was conceptualized from a developer standpoint, where the creativity which goes into games was seen as similar to that of other works such as film and novel. Several participants also expressed the view that games require creativity from both developers and players, illuminating the view of games as a form of co-authorship where input from both sides is required for the game to be fully realized.

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