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Children's Storytelling in Virtual Worlds: A Critique

Abstract In this chapter, we offer a critique of the growing use of virtual worlds for children, particularly as tools to teach children the basic elements of storytelling: language, narrative, the creative imagination, and generativity in applying learned skills. We argue that virtual storytelling is not like other forms of storytelling, particularly for children, who are still developing these abilities. There is evidence that digital storytelling through virtual worlds lacks many of the positive aspects of non-digital storytelling, and may even inhibit the development of imagination in children. In this chapter, we review the literature on children and virtual worlds, focusing on the importance and development of the creative imagination in children. We discuss the visualization hypothesis – a theory that was developed to explain how television produces a reductive effect on the imagination because it presents the user with ready-made visual images – and generalize it to new media, including virtual worlds. We posit the ‘displacement hypothesis’, which states that when manufactured content is supplied ready-made to the individual, then it displaces the creative and imaginative processes that the individual would otherwise supply for him or herself. The more immersive the medium, the more psychological dimensions are captured by this displacement – such as sound, the visual, narrative content, time, space, physical presence – the more reductive are the effects on the individual’s imagination. We conclude that further research is needed in order to determine the long-term effects of virtual worlds on child development, and that in the meantime virtual worlds are an inappropriate medium for children’s storytelling.

Introduction

Virtual worlds – games in which the user interacts with a persistent digital environment through a self-representation known as an “avatar” (Hew and Cheung, 2010: 34) – are a unique form of digital storytelling. Unlike ordinary games, virtual worlds are highly immersive, and create the impression that the user has a good deal of control over their interactions with their virtual environment. Therefore, it might appear at first glance that virtual worlds can become an important tool for children’s storytelling, for engaging and teaching children skills in language, constructing narratives, and developing imagination. Indeed, virtual worlds have begun to be used in this manner, even for pre- and primary school-aged children (*ibid.*). Some scholars, such as Bitarello (2008: 2), argue that virtual worlds have long existed in literature, art, and mythology, and they view virtual worlds as

merely an extension of these non-digital forms of storytelling. In this chapter, we challenge this view of virtual worlds, focusing on the negative effects that virtual worlds can have on the development of the creative imagination in young children, and thus on their ability to learn the complexities of language and narrative – the essentials of storytelling. We argue that there is a fundamental difference between non-virtual storytelling that seeks to ignite the imagination, and virtual storytelling, which can limit and oppress the development of the imagination in young children.

The research on *non-digital* storytelling shows that it enhances children's imagination (Raines and Isbell, 1994: 264–265), supports and extends children's social lives (Britsch, 1992: 80), further develops their cognitive skills (such as “deferred imitation”, speculation and knowledge) and contributes significantly to all aspects of language development (Cooper et al., 1992: 10–11). There may be a temptation, therefore, to assume that digital storytelling through virtual worlds can be similarly effective in teaching young children. While some authors argue to the contrary (Miller, 2008: 189–227; Lundby, 2008: 1–21), we argue that digital storytelling through virtual worlds not only lacks these positive aspects, especially with respect to the imagination, but may actually suppress them.

Many of the negative effects that virtual worlds have on the development of the imagination are caused precisely by the characteristic that makes their use in education seem attractive: their degree of immersion, which is a heightened sense of interactivity between the user and the virtual environment. We refer to this as a ‘sense’ or ‘appearance’ of interactivity, because it actually masks the fact that the user remains bound by the rules of the game, while it draws the user in to a greater degree than do ordinary games. As Sanchez-Vives & Slater (2005) remind us, “[t]he degree of immersion is an objective property of a system that, in principle, can be measured independently of the experience that it engenders” (p. 333). There are therefore possible avenues for testing the level of immersion that a virtual world engenders, and thereupon to also test for its effects upon the user. We posit that virtual worlds can harm the normal development of imagination in children by the fact that it displaces true make-believe play, while *pretending* to provide it. Not only does this displace the benefits of make-believe play, but it distorts children's developing sense perceptions and negatively impacts their ability to tell reality from fantasy; the imagination and the creativity it engenders is thus stunted, while rule-based and sensory-motor thinking predominate. Thus, storytelling through virtual worlds is in direct conflict with the main goals of storytelling itself. This heightened degree of immersion can also give rise to many of the ill effects produced by the use of virtual worlds, including Internet Addiction

Disorder (IAD) and Pathological Internet Use (PIU) (Hilarie et al., 2012: 292–298; Kuss et al., 2014: 27). Moreover, the context of storytelling emphasizes the fundamental difference between non-virtual storytelling that seeks to ignite and foster the imagination, and virtual storytelling, which can displace, distort, and limit children's developing imagination. This chapter will open with a discussion and review of the literature on virtual worlds, particularly those that target children, and will discuss potential harms to the development of children's imagination through their interactions with virtual worlds. Next, we review the literature on the development of imagination in children and the empirical research concerning the impact of artificial media on this development. We conclude that virtual worlds are an inappropriate medium for children's storytelling.

Virtual Worlds

A virtual world is an artificial environment created by computer software that enables users to interact with other users and with the software itself using self-representational figures called avatars (Hew and Cheung, 2010: 34). Communication can be performed through text, graphics, avatar movements, gestures and sounds (Wadley and Benda, 2007). The user logs onto the internet to a server hosting the software creating the virtual world. This software introduces the user to perceptive stimuli and the user can manipulate objects in the presented environment, thereby experiencing a certain degree of virtual presence. These virtual worlds can look similar to the real world or to a fantasy world – a world in which the rules of nature are different than the rules of the real world and the characters in it are not known in reality (Hunter, 2003: 443).

In her book, *Reality is Broken: Why Games Make Us Better and How They Can Change the World*, Jane McGonigal (2011) illustrates the staggering influence of virtual worlds on our lives:

[I]f you add up all the hours that gamers across the globe have spent playing *World of Warcraft* since the massively multiplayer online (MMO) role-playing game (RPG) first launched in 2004, you get a grand total of just over 50 billion collective hours – or 5.93 million years. To put that number in perspective: 5.93 million years ago is almost exactly the moment in history that our earliest human ancestors first stood upright. (McGonigal 2011: 52)

McGonigal concludes that we have therefore spent as much time playing *World of Warcraft* (WoW) as we have spent *evolving as a species* (ibid.).

Virtual worlds, as a result of their high degree of immersion, are often very good at drawing players in for long periods of time, and this is an important source of the revenue they are able to generate. *World of Warcraft* reaps an estimated

\$100 million every single month (Superdata, 2013). McGonigal points out that “no other computer game has ever made so much money keeping so many players occupied for so long. Each WoW player spends on average between seventeen and twenty-two hours per week in the virtual world, more time than any other computer game attracts” (ibid.).

Children’s virtual worlds are not far behind in their abilities to generate large revenues. Research suggests that children are using electronic media at younger ages (Rideout et al., 2003), and news reports indicate that children as young as three are participating in virtual worlds (Chmielewski et al., 2008). There are over 400 virtual worlds designed and targeted specifically to children (Smolen, 2012; Kzero, 2013). According to some estimates, virtual worlds garnered over one billion users in 2010, roughly half of whom were under fifteen years old, with 219 million users being between the ages of 5 and 11 years old (Watters, 2010).

One popular virtual world for children is *Webkinz*. Dellinger-Pate and Conforti (2010) describe *Webkinz* as an all-encompassing experience, stating that

[*Webkinz*] is not merely a mode of children’s entertainment, a beloved stuffed toy, a profit-driven phenomenon, an educational tool, a source of family negotiation, an aggressive marketing device, a source of addiction, or a comment on cultural values. It is all of them. (Dellinger-Pate and Conforti 2010: 252)

This description illustrates the growing influence exerted by virtual worlds on children’s early experiences. There is no standard definition or description for children’s experience in virtual worlds. However, most of the major brands in the market are based around a mix of social interaction and casual game-play. One classic example is *Club Penguin*.

In *Club Penguin*, children sign up as registered users and take on the form of penguin avatars. They then go to a fantasy world called Penguin Island where they can play games, customize their characters and talk to other children’s penguin avatars. Chat is moderated to ensure that there is no kind of anti-social behavior. Registered users of Club Penguin, typically aged 6–12 with a slight skew towards girls, can get a basic entertainment experience for free. If they want the complete experience, they have to pay a subscription fee of \$6–8 per month (*Club Penguin*, 2015).

Club Penguin’s headline statistics indicate that the site has 175 million registered users in 190 countries, up from around 12 million at the time of its 2007 purchase by Disney for \$350 million (Eldon, 2007). This indicates strong growth, but perhaps more important is the number of children who choose to pay for premium access. Disney is coy, but analysts estimate this is around 5–10% of registered users (White, 2012). If these estimates are correct, then Disney may be generating as

much as \$122.5 million per month from subscription fees alone, which indicates the extremely large profits to be made from children's virtual worlds.

Two key differences that separate virtual worlds from other video games are that virtual worlds are both persistent and dynamic (Lastowka and Hunter, 2004: 5–6). This means that even when the player is not in the virtual world, the virtual environment continues to exist and change over time (Rogers 2008: 407; Castronova, 2005: 80). Virtual worlds' heightened sense of interactivity is another important difference between video games and virtual worlds. Jenkins (2009) states that “[v]ideo games like *Zelda*, *Halo*, or *Harry Potter* allow players to enter into an environment and interact with objects, but they don't allow the player to create an environment and that's what virtual worlds are all about.” But it is precisely their persistence, dynamism, and heightened sense of interactivity that we argue lead to the ill effects of virtual worlds. Dellinger-Pate and Conforti (2010) illustrate the potential harmful influence on children through the following story:

She [the author's colleague] and her family were traveling for Christmas and unable to get to a computer easily when her son wanted to play on *Webkinz*. When her son was finally able to log on he became instantly panicked and cried uncontrollably over the fear that his pet was dying. He saw that his beloved avatar was very ill and in the hospital due to malnutrition. The mother knew the pet was, indeed, not going to die; the website makes that clear to parents in its introduction. Yet her son was distraught over having neglected his poor pet during the Christmas season. He vowed never to let that many days go by without caring for the animal's needs. (Ibid: 267)

This story illustrates the child's inability to distinguish between the virtual nature of the *Webkinz* pet and reality. His perception of the virtual world's persistence is derived from his experience in the real world. He reacts normally to an abnormal environment. However, this is to the child's detriment, and to the website operator's financial benefit.

There are those who argue that the growing number of virtual worlds geared toward young children is a benefit, one that can “provide young learners with experiences that scaffold skills needed for community building and civic engagement” (Berson et al., 2009: 28), while interconnecting with people and issues they confront in real life (Wang, 2010: 32). One broad-based review of the literature showed that virtual worlds can have a positive impact in creating communicative spaces for remote users, as well as in assisting experiential skills learning, although this study focused on older children and adult learners (Hew and Cheung, 2010: 45–47). Another study found that virtual worlds had a positive impact on primary students' achievement and motivation in learning geography facts (Tüzün et al., 2009: 75–76).

Others disagree, citing evidence of the negative effects of virtual worlds on child development. Many of these critiques point to the narratives embedded in the virtual worlds themselves and demonstrate their harmful effects on children. For example, Marsh (2010: 30) states that while virtual worlds are a space in which children can engage in make-believe and narrative-related play, this is impeded by the ways in which virtual worlds restrict children's choices (ibid.: 35-6). Similarly, Hannaford (2012: 17) found that children engaged imaginatively with one another and the virtual environment, and that they took the narratives they learned there back with them into the outside world. Both Marsh and Hannaford discuss children's imagination and make-believe play in terms of identity practice, and so one might be tempted to conclude from their work that if we constructed better and more inclusive narratives for children in their virtual worlds, then this problem might be overcome.

However, the problems go deeper than the narrative content and are often embedded in the structure of the game itself. Dellinger-Pate and Conforti's (2010) study of *Webkinz* led them to conclude that the game harms children's developing communication skills and social connectivity. They state, "there is no scenario where cooperation between players takes place. There is no true community in this playground. Although the site visuals offer the illusion of community (a village with shops and friendly, furry characters waving to each other, with open, green fields to run and play in), they are fleeting images and never experienced by the player" (p. 264). Grimes (2015a: 120) has also found that the narratives in children's virtual worlds promote consumer culture. Children are instructed to acquire and display items and to construct social hierarchies based on acquisition (where restrictions based upon a lack of funds are taught as "fair play"). Respecting copyright and other corporate rules are embedded in the structure of the game itself (ibid.), as is the practice of "immersive advertising," which "enables interactive and deeply embedded forms of product placement" (ibid.: 122). Even more invisible are the ways in which children are co-opted into performing forms of immaterial labor, such as data mining and market research, but also less tangible forms of labor (ibid.: 126). After all, it is the participation of the children themselves in the game that actually constructs the virtual environment, and it is their interactions with and emotional connection to the game that lend it its meaning, its cultural value and, ultimately, its immense monetary value as well (ibid.).

Grimes (2015b: 136) concludes that virtual worlds provide very limited opportunities for children to exercise their imagination in make-believe play, since adults ultimately shape and impose an idealized play environment on the child. She states:

By restricting opportunities for children to create their own UGC [user-generated content], reappropriate branded content, or even speak freely about the commercial content encountered, these worlds have excluded some of the most potentially valuable dimensions of children's play. (ibid.: 142)

Plowman (2004: 221) found that when their own imagination exceeded the functionality of a "smart" toy, children quickly became unhappy and preferred to play with the toy switched off. We conclude that, even if adults could design "suitable" narrative content into the virtual world, its use would continue to have harmful effects on children's developing imagination. The virtual worlds would continue to displace children's true imaginative interaction with adult-generated rules and constructs – ones whose weaknesses cannot easily be discerned or simply switched off.

The Imagination

The essence of imagination lies in its generativity, in the fact that through our imagination we can conjure up experiences and representations that are wholly novel to our lived experiences. Imagination is critical to children's mental development and abilities to learn, as we discuss further below. Despite its importance, it remains intangible and difficult to define. Cohen & MacKeith (1991) described psychologists' ambivalence towards it, stating that "on the one hand, it fascinates. Just as no other species can speak, no other species can imagine or invent. On the other hand, it is extremely hard to study imagination – especially experimentally" (ibid.: 11–14).

Despite this ambivalence, there have been numerous attempts to define and classify the imagination, none of which have yet received widespread consensus. Vygotsky (1978) defined imagination as "a new formation which is not present in the consciousness of the very young child, is totally absent in animals and represents a specifically human form of conscious activity. Like all functions of consciousness, it originally arises from action" (ibid.: 537). One can imagine, for example, a bird turning into a snake while flying over a lake without ever having seen such a transformation actually taking place. One can produce novel representations in the mind by generatively combining past perceived representations.

Elaborating on this definition, Singer & Singer (2005) define imagination as a

form of human thought characterized by the ability of the individual to reproduce images or concepts originally derived from the basic senses, but now reflected in one's consciousness as memories, fantasies, or future plans. These sensory-derived images, 'pictures in the mind's eye', mental conversations, or remembered or anticipated smells,

touches, tastes, or movements can be reshaped and recombined into new images or possible future dialogues. (Ibid.: 16)

The emphasis is on the “images or concepts originally derived from the basic senses” that are then “reshaped and recombined”. But this raises the question of whether “images or concepts” that are artificially mediated – and which are usually the product of the imaginary process of a TV show or video game creator – will function in the same way as basic building blocks for the user’s imagination.

Other authors have defined the imagination in the context of the human spirit. For Watkins (1990: 75), the imagination is “the intermediate universe – the universe between pure spirit and the physical, sensible world – which is the world of the symbol and of imagining”. According to Latham (2003: 91), “[i]maginative capacity thus underpins our species’ ability to make sense and guide us beyond ego-directed aims and conditions that life brings our way. Creative fantasy freely expressed is our key to balance and wholeness”. Dubos (1965: 7) argued that “[m]an’s propensity to imagine what does not yet exist, including what will never come to pass ... most clearly differentiates him from animals. The more human he is, the more intensely do his anticipations of the future affect the character of his responses to the forces of the present”. The imagination bridges the time from the present to the future.

Ulanov and Ulanov (1991) point out that there is no life of the spirit without imagination. “Properly understood and pursued,” they state, “the imagination is perhaps our most reliable way of bringing the world of the unconscious into some degree of consciousness and our best means of corresponding with the graces offered us in the life of the spirit” (ibid.: 3). In our spiritual lives, the imagination enables paths that cannot be traveled in any other way, and its absence detaches us from the unconscious and the spirit. This is in stark contrast to the superficial and artificial representations of children’s virtual worlds, with their flat and fleeting images, a world in which everything is offered, but nothing can truly be experienced.

A more prosaic definition of the imagination claims that imagination is an activity of the human brain, operating much like memory or logic or any other cognitive process (Misson, 2000). In this view, there is nothing mystical about the imagination: it is simply working on the material present in the brain (Feldman et al., 1994: 47). The critical character of the imagination lies in its generative and transformative abilities, to take existing ingredients and bring them together to generate something novel. It is perhaps for this reason that imagination is critical to learning. As Egan (1990: 166) states, “all learning that is to be of educational value seems necessarily to involve an imaginative-finite creative component. The

imagination is the making, composing, vivifying power that is required if the student is to reconstitute codes into living knowledge”.

Generally, imagination has not been studied as a single concept. Valkenburg and van der Voort (1994: 316–317), in a review of the research on the influence of TV on daydreaming and creative imagination, found three closely related but distinguishable imaginal processes, which they define as follows: imaginative play – play in which children transcend the constraints of reality by acting “as if”; daydreaming – a state of consciousness characterized by a shift of attention from external stimuli to internal thoughts and images; and creative imagination, which is defined as the capacity to generate many different novel or unusual ideas (Valkenburg and Calvert, 2012: 158). This chapter will not deal with daydreaming, being outside the scope of this discussion, but it will discuss below imaginative play, the creative imagination, and the negative effects of media on the imagination as expressed in dreams.

Virtual worlds differ in many ways from authentic imaginary experiences, and these differences may actually impede the development of imagination in young children. According to Cobb, the psychological distance between the self and the object of desire “is the locus in which the ecology of imagination in childhood has its origin” (ibid.: 56). In virtual worlds, the distance between “the self and the object of desire” is vague since the self is portrayed as a virtual avatar; the object of desire is always at hand in the virtual environment but cannot be reached in the real one.

Scholars have defined four key characteristics of children's imaginary worlds: first, the child must be able to distinguish between what they have imagined and what is real; second, the child's interest in the fantasy world persists for months or years; third, the child will be proud of the world and consistent about it; lastly, the child will feel that the world matters to him or her (these worlds usually disappear by the age of ten) (Cohen and MacKeith, 1988: 14; Silvey and MacKeith, 1988: 173–174). As with the tale of the child whose *Webkinz* pet fell ill from his disuse of the game, virtual worlds can mimic the last three characteristics. However, it is on the first characteristic that virtual worlds fall short: the child has not imagined the world, and is not in control. The child may, therefore, have significant difficulties distinguishing the virtual world from the real one.

Others contend that the development of the imagination is critical not only to our individual development but also to our collective development. Jung (1933), already cognizant of the pressures of our modern life, warns us not to abandon our species' hard-fought accomplishments in developing our spiritual life. “The wheel of history,” he states, “must not be turned back, and man's advance toward

a spiritual life, which began with the primitive rites of initiation, must not be denied” (ibid.: 125). The consequences of losing or not developing our imaginative capacities can have serious and as yet unforeseen repercussions and, as Jung warns us, our collective accomplishments can be turned back.

In summary, the imagination is unique to humans, and it is critical for our learning and for children’s proper intellectual development. It is also a key part of what makes us *human*. In addition, the imagination is a learned ability, one which is not yet present in young children (we can conclude from Piaget’s theory on make-believe play that the imagination develops along with make-believe play). It is originally derived from the basic senses, works on the material that is present in the brain and bridges the gap between the self and the object of desire, as well as the time from the present to the future. The development of the imagination also appears necessary in order to be able to distinguish between the imagined and the real. In children, the imagination develops and expresses in imaginative play and creative imagination. The emphasis is on the novel reshaping of already-familiar images and experiences. These skills are all essential for both understanding and creating stories. But the question that we wish to raise in this chapter is whether the images and concepts that children receive from playing in virtual worlds function as building blocks for the development of the child’s imagination in the same way as images and concepts derived from less artificial media. To take a simple example, the images a child gets from having a book read to them come from his or her own mind’s eye, but the images they get from watching a show on TV come from the creator and are imposed upon the child, crowding out the images in the mind’s eye the child would otherwise create. Because a virtual world is an even more fully-immersive experience for the child than a television show, even more of the images and concepts that child users receive are imposed upon them, thus increasing the ill effects of the medium. Below, we describe good reasons why we think this is the case, and why further research needs to be done in this area.

The Development of the Imagination

Imagination is critical to children’s learning and development. Vygotsky (2004: 11–12) states that “child’s play is not simply a reproduction of what he has experienced, but a creative reworking of the impressions he has acquired. He combines them and uses them to construct a new reality, one that conforms to his own needs and desires”. When the child is rehearsing a situation from his life with toys, he is not only duplicating the situation in reality but is creating a scenario that exceeds that reality and portrays what will or may happen, according to the child’s fears, hopes and other internal drives. Winnicott (1971: 72–73) further states that

"[i]t is in playing and only in playing that the individual child or adult is able to be creative and to use the whole personality, and it is only in being creative that the individual discovers the self". These two steps are essential. First, imaginative playing will enable creativity, and only in creativity will we discover ourselves.

While many animals engage in play, it lacks the generativity of children's play. Cobb (1977: 29) contends that "while other animals do play, the human child's play includes the effort to be something other than what he actually is, to 'act out' and to dramatize speculation". Wittgenstein (1949: 37e) pondered, "Could one imagine a world in which there could be no pretend?". Play is essential for the imagination, but it is pretend play that most deeply express and develops our creativity and imagination.

According to Piaget's (1962) influential developmental theory, there are three main types of children's play that direct and foster a child's mental development: practice games, symbolic games and games with rules. When a child jumps over a stream for the fun of jumping, she is engaging in a practice game. Games with rules are "games with sensory-motor combinations (races, marbles, ball games, etc.) or intellectual combinations (cards, chess, etc.), in which there is competition between individuals (otherwise rules would be useless) and which are regulated either by a code handed down from earlier generations, or by temporary agreement" (ibid.: 142). Symbolic games imply representation of an absent object, since there is a comparison between a given and an imagined element. For example, a child pushing a box and imagining it is a car. It is the symbolic, or pretend, games that are most important in the context of the development of imagination.

Piaget argues that "while mere practice play begins with the first months of life and symbolic play during the second year, games with rules rarely occur before stage II (age 4–7) and belong mainly to the third period (from 7–11)" (ibid.: 142). Piaget theorizes that from ages 4 to 7, symbolic games begin to lose their frequency, but continue to appear in the same intensity. From the age of 7 to 11 or 12, symbolic play declines and games with rules (social games) emerge. According to Piaget, symbolic play takes place mainly from about age 2 to 7. Singer and Singer (1990: 32) agree that "imaginative play emerges toward the end of the child's second post-partum year, struggles fitfully toward a flowering well into the third year, and in the fourth, fifth, and sixth years is a significant factor in the child's behavioral repertory". However, they claim that while "Piaget seemed to suggest that imaginative play fades by the early school years as 'operational' thought takes over, we shall suggest that it is merely submerged in the interest of the changing demands of school decorum and other social pressures" (ibid.). In their view, it is not an internal psychological force that propels the shift, but external ones. We

posit that the use of virtual worlds may spur on this shift, making the symbolic play period shorter and thus impairing the process of imagination development.

Recognizing the developmental importance of the imagination, Singer & Singer propose that “our human stream of consciousness emerges gradually in childhood from children’s play and from their pretend games” (ibid.). As explained by Grossman & Degaetano (1999: 58):

The brain of the child is not a miniature version of the adult brain ... the young brain is an organ that will change considerably as it matures over the course of childhood and adolescence. As it builds neural structures for optimal development, the young brain is very vulnerable to stimulus from its environment.

Without pretend play, the imagination will not properly develop in young children, and the literature suggests that some of the deficits created thereby may be life-long. We posit that another mechanism whereby virtual worlds may be harming this development by misleading the child’s brain to think he is engaged in pretend play, while he is actually engaged in a combination of practice and rule games.

Cobb’s (1977) findings seem to support this proposition. She writes:

The sense of wonder is spontaneous, a prerogative of childhood. When it is maintained as an attitude, or a point of view, in later life, wonder permits a response of the nervous system to the universe that incites the mind to organize novelty of pattern and form out of incoming information. The ability of the adult to look upon the world with wonder is thus a technique and an essential instrument in the work of the poet, the artist or the creative thinker. (Ibid.: 27)

The artificial medium and the mediated stimulus it sends to the senses curtail this sense of wonder. Instead of experiencing the world in wonder, the child is experiencing the virtual world where the alleged wonder is mediated, misleading, and masks the ‘true’ imaginary universe with the ready-made and mediated one.

The Role of Play

The chief value of play in child development lies in the child’s total control over their imaginary universe, free from external constraints – an accomplishment that is simply not possible in the mediated virtual world. Piaget (1962: 87) argued that “[u]nlike objective thought, which seeks to adapt itself to the requirements of external reality, imaginative play is a symbolic transposition which subjects things to the child’s activity, without rules or limitations”. Although Piaget and Vygotsky experienced a theoretical controversy about the nature of imagination, there was a mutual understanding between them that “the symbolic game as a whole is again a practice

game, but a practice game which exercises (and more particularly 'pre-exercises') the specific form of thought which is imagination" (Piaget, 1962: 118). Symbolic games develop the imagination free from any external constraints, a freedom which is not possible in virtual worlds that are inherently bound to some rules.

Mitchell (2002: 4) explains that "pretense or make-believe is a mental activity involving imagination that is intentionally projected onto something". More elaborately, make-believe is "the use of ... props in imaginative activities," where props are "objects of imagining" (Walton, 1990: 25). Props include the pretenders themselves and the objects. Pretence in play is called "symbolic play", but pretending also occurs outside play, and need not be "playful" (Mitchell, 2002: 4). Pretence is essential for the imagination development either in play or outside it. But it is only possible when there are no external constraints forced on the child.

Adults and other children might force external constraints, the same as do virtual worlds. The difference is that external constraints in the real world are obvious and apparent, while virtual worlds actually enforce external constraints, while pretending to provide props for imaginative play. For example, a child can dress its penguin in *Club Penguin*, which is allegedly imaginative play, but *cannot use the penguin as a chair*, i.e., the child cannot stand the penguin as a symbol for some other object or idea, which constitutes true imaginative play.

Singer and Singer (1990) support the developmental value of symbolic games, stating that when "children engage in symbolic games they are practicing mental skills that will later stand them in good stead, just as practice in walking, balancing, or swimming aids the development of motor skills" (ibid.: 22). In a follow-up study of children from age eight to twelve, twenty years later, Shiner, et al. (2003: 1165–1166) found that those children who scored high in social skills, academic attainment, and work competence maintained these patterns as adults. These kinds of skills are the same as those found to emerge from imaginative play in the earlier years (Singer & Singer, 2001: 16–20; Smilansky, 1986: 926). Therefore, deficits in imagination in early years are correlated with long-term deficits in other pro-social skills.

Symbolic play enables children to have a clear sense of what is real and what is fantasy (Aronson and Golomb, 1999: 1424;). Russ conducted a study with 121 first and second graders, and then a follow up study with 31 of them in fifth and sixth grade. She found that "children who play imaginatively in their early years are more likely to think creatively ... good early play skills predicted the ability to be creative and generate alternative solutions to everyday problems" (Adams, 2003: 3). Therefore, children who substitute their imaginative play with the rule-bound play in virtual worlds may not fully develop these skills.

Make-believe play produces other important outcomes. Spiegel (2008) argues that it develops the ability to self-regulate; Singer and Singer (1990: 10) posit that imaginative play is associated with more positive emotions in children. Other studies have shown how children engaging together in make-believe play demonstrate advances in recognizing others' thoughts, or in differentiating fantasy representations from reality (Rosen & Singer, 1997: 1133; Schwebel, Rosen and Singer, 1999: 334). Children engaged together in play in virtual worlds are not involved in make-believe play; rather, they are playing games with rules, but these are the rules set by the creators of the virtual world.

An illustration of the negative effects of the lack of pretend play was made by Wulff (1985: 141), who finds that autistic children have severe early deprivations in symbolic play. Harris (2000: 6) states that "the study of early pathology shows that it is the absence of early imagination, and not its presence, that is pathological". He continues, stating that "[o]ne of the major characteristics of the syndrome of early childhood autism is an absence or impoverishment of pretend play... The long term social and cognitive restriction of people with autism suggest that the capacity for pretence is an important foundation for lifelong normality" (ibid.). The imagination, the ability to think symbolically, and therefore the development of normal cognition are all closely linked. This can clearly be seen in children who have serious deficits in symbolic thinking and cannot engage in symbolic or pretend play, as occurs in children who are on the severe end of the autism spectrum.

Children playing in virtual worlds might, therefore, interact with the virtual world as though they are engaged in make-believe play, while they are really engaged in rule-bound play. We argue that this interaction with the game removes the benefits children would otherwise receive from their play. First, children are not receiving the benefits from symbolic play when they play in virtual worlds, and second, because they may acquire a learned deficit in the ability to distinguish the real world from the fantasy.

The Creative Imagination

It should be noted that this chapter deals with the *creative imagination* rather than *creativity* itself. The commonalities and differences between the two are beyond the scope of this chapter. Singer and Singer (1990) have noted some of the differences between the two concepts, stating that "[i]magination seems freer and broader, since our thoughts may remain as private and as fanciful as we may want them to be, with no constraints. Imagination may take the form of visual imagery with no obvious outcome other than the pleasure it affords us" (p. 268–269). It is the creative imagination in this sense that we discuss below.

Vygotsky saw creativity as a way of adapting to the challenges posed by our environment. "A creature that is perfectly adapted to its environment," he states, "would not want anything, would not have anything to strive for, and, of course, would not be able to create anything" (ibid.: 29). Rogers (1959: 69) points out that, with the kaleidoscope of changes that are occurring at a geometric rate, the development of genuine, creative adaptation may represent the only way forward to build a constructive continuity. As Rogers (1959) states, "[u]nless man can make new and original adaptations to his environment as rapidly as his science can change the environment, our culture will perish. Not only individual maladjustment and group tensions but international annihilation will be the price we pay for a lack of creativity" (ibid. 70). There may be a heavy price to pay, therefore, if genuine creative adaptation cannot be fostered. At the same time as our real environment is changing rapidly, our virtual environment is changing in the opposite direction, becoming more and more convenient for us and adapting to our whims, rather than posing challenges to our creativity.

In this context, Winnicott (1971: 91) argues that "everything that happens is creative except in so far as the individual is ill, or is hampered by ongoing environmental factors which stifle his creative processes". When the child is spending time in the pre-designed environment of the virtual world, his creativity is stifled in this manner. Cobb (1977: 15) states that "a major clue to mental and psychosocial health lies in the spontaneous and innately creative imagination of childhood, both as form of learning and as a function of the organizing powers of the perceiving nervous system". As can be seen in children with severe autism, the lack of symbolic thinking and the creative imagination presents itself as a severe cognitive pathology.

Winnicott (1971: 87) further states that "many individuals have experienced just enough of creative living to recognize that for most of their time they are living uncreatively, as if caught up in the creativity of someone else, or of a machine". However, children have not yet experienced enough creative imagining of their own to realize they are "caught up in the creativity of someone else, or of a machine". Vygotsky (2004) concludes that "[t]he entire future of humanity will be attained through the creative imagination ... The development of a creative individual, one who strives for the future, is enabled by creative imagination embodied in the present" (p. 88). But what if there is no "creative imagination embodied in the present" because of the influence of an all-encompassing virtual environment?

The Senses

The argument that technology alters our sensory perception is not new. McLuhan (1964) remarked on the changes in the senses as a result of the introduction of technology, stating that “[i]f technology is introduced from within or from without a culture, and if it gives new stress or ascendancy to one or another of our senses, the ratio among all our senses is altered. We no longer feel the same, nor do our eyes and ears and other senses remain the same” (ibid.: 24). Advanced technologies, such as virtual worlds, provide more powerful sensory output, like time and interaction, all of which were not present at the time of McLuhan’s writing. We ought, therefore, to think carefully about how our sensory perceptions are being altered by these developing virtual cultures.

In an interview with Rudolf Arnheim (Peterson, 1972), he discusses a generation that had lost touch with its senses. Arnheim states:

If you look at television for hours every day, you must grow up with the ghostly feeling that you live in a world of wraiths. You see, Jim, the mind finds it hard to grasp images that do not have significant form, and in grasping an object the mind finds meaning in that object... The visual sense in most men and women has been reduced to an economic minimum – the effort it takes to tell that the piece of paper is not a piece of bread. (p. 92) ... We have lost the human ability to taste the feast of meaning that each event and object offers to our senses. (Ibid.: 55)

The mind cannot fully develop its imagination based on sensory input coming from an artificial medium, and this is more so for virtual worlds than it was in Arnheim’s time.

Pearce (1985: 63) states that “[a]bstract imagery is not present to the senses; it must be created from within. We must then process that imagery, transfer it into images available to the senses out there. If we cannot, we have no imagination, and if we have no imagination we are automatically grounded in sensory-motor imagery”. When the mind is bombarded with sensory input from an artificial medium, there is no place for acquiring and manipulating abstract imagery. There is no creation of images from within, and therefore no imagination.

In his warning to us about the dangerous aspects of children’s exposure to artificial media, Latham (2003: iv) concludes that “young children’s spontaneous imaginative capabilities may be neurologically foreclosed and become increasingly impoverished as exposure to screen-based electronic entertainment rises”. The internal process of imagination is replaced by the outside exposure to the artificial media. Kline (1989) summarizes this shift as one in which “marketing, rather than entertainment, considerations dominate the design of children’s characters, the fictions in which they appear, and hence the way children play” (ibid.: 311;

Levin & Rosenquest, 2001: 243). At the same time, “[p]lay, the most important modality of childhood learning is thus colonized by marketing objectives making the imagination the organ of corporate desire. *The consumption ethos has become the vortex of children's culture*” (ibid. – emphasis added).

Virtual worlds may therefore pose a fundamental harm to the development of children's imagination through the ways in which they distort children's sense perceptions. However, the harm posed to children's imagination by the use of virtual worlds is challenging in two ways: it is intangible, and there is a paucity of research into children's experiences with virtual worlds.

Empirical Research on Children and the Media: The Visualization Hypothesis

Most, if not all, of the empirical research regarding media and the imagination was conducted during the 1980s and therefore focused on television. For several reasons – undoubtedly the problem of quantifying imagination being one of them – this line of research has not been pursued further to other, more advanced artificial mediums. Therefore, we will review the existing research in this field, and the implications for the effects of more advanced artificial mediums will be drawn by analogy.

Two competing theories have been introduced regarding the effects of TV use on creative imagination: stimulation theory posits that TV stimulates creative imagination through its content; reduction theory, on the other hand, posits that TV hinders the development of creative imagination (Valkenburg and van der Voort, 1994: 324–325). While five types of reduction hypotheses have been proposed in the literature (Salomon, 1984: 650; Singer et al. 1984), only the visualization hypothesis is relevant and will be discussed here. The visualization hypothesis posits, in essence, that the visual nature of TV is responsible for the reductive effect that TV has on creative imagination. Unlike verbal media, such as radio and print, TV presents the viewer with ready-made visual images and thus leaves little room for forming one's own. When engaged in creative thinking, it is hard to dissociate oneself from the images supplied by TV, with the result that one has greater difficulty generating novel ideas and images from TV (Greenfield and Beagles-Ross, 1998: 74; Meline, 1976: 81; Webb, 1980: 10).

Valkenburg and van der Voort (1994: 336–337) have found some support for the visualization hypothesis. They reviewed a number of studies which indicated that children who watched a TV story more often used visual content as a basis for drawing story related inferences, whereas children who had heard the same story on a radio more often based their inferences on the verbal content, as well

as information from outside of the story, such as personal experience (ibid.: 332; see also Beagles-Ross and Gat, 1983; Greenfield and Beagles-Ross, 1988; Meringoff, 1980; Vibbert and Meringoff, 1981). Goldberg (1994), too, found that “[TV] supplies the same image to millions of people at the same time. We process those images rather than create them” (p. 16). Goldberg (1994) and Latham (2003) support this line of thinking. Latham states:

With images that are processed through the sensory system, rather than created in the mind’s eye, we take in what Giegerich (1985) refers to as a ‘distillation of image’ (p. 17) ... In the case of young children, neuronal pathways are being wired and shed according to their use patterns. When concentrated representational electronic images are observed through the visual sensory system, other body and sense modalities consequently receive less stimulation. (Goldberg, 1994: 11–12)

Further support for the visualization hypothesis was provided by Conway and Siegelman (1978), who found that “[h]eavy viewing destroys the natural ability of children to form mental images from what they hear or read. With too much TV, the young child’s basic capacity of imagination, like an unused muscle, never reaches a level adequate for performing even the most elementary of creative acts” (ibid.: 191). Mander (1978), discussing the visualization hypothesis, wrote that “[m]ore than any other single effect, television places images in our brain. It is a melancholy fact that most of us give little importance to this implantation, perhaps because we have lost touch with our own image-creating abilities, how we use them and the critical functions they serve in our lives” (ibid.: 216).

This can have a negative effect on the development of creative imagination in children. Pearce (1992: 166) argues:

Television feeds both stimulus and response into that infant-child brain, as a single paired-effect, and therein lays the danger. *Television floods the brain with a counterfeit of the response the brain is supposed to learn to make to the stimuli of words or music.* As a result, much structural coupling between mind and environment is eliminated; few metaphoric images develop; few higher cortical areas of the brain are called into play; few, if any, symbolic structures develop.

Pearce (ibid.: 167) concludes that “failing to develop imagery means having no imagination”.

In their research on video game users and dreams, Gackenbach et al. (2009: 219) found that high-end users were associated with the lucid dream type, had more dead and imaginary characters in their dreams (Gackenbach, 2006: 108; Gackenbach et al., 2009: 219), and were coded as containing more bizarre elements in their dreams (ibid, 2009: 227). Gackenbach et al. (2009b) assume that

dream bizarreness in high-end video game users is a result of a more developed creative imagination (ibid.: 228).

Similarly, a study conducted among users of the virtual world *Everquest* found that 80.6% of the female and 58.4% of the male players reported dreaming of the virtual world or having a dream taking place in the virtual world environment (Smahel et al., 2007). However, these findings may rather indicate the deep influence of video games (and consequently, virtual worlds) on the user. It might be said that the most 'sacred' space of the imagination – dreams – has been 'invaded' by the artificial medium, and that this is a warning sign as to its deep and embracing influence.

We argue that virtual worlds and virtual realities call upon us to extend the visualization hypothesis further – from the senses of vision and sound to higher psychological dimensions of perception, including of time, interaction and associated aspects as a narrative construction, and judgments concerning reality versus fantasy. We posit that these are weak and almost irrelevant in TV, stronger in video games and predominant in virtual worlds, as the user becomes more and more immersed in the medium, and more and more of the material is supplied for the user by the medium. This is the key theoretical advance that we propose in this chapter. Accordingly, we propose to rename this phenomenon the 'displacement hypothesis' in order to capture these new cognitive and sensory dimensions that are being displaced by the immersive virtual environment, and to emphasize that, when manufactured content is supplied ready-made to the individual, it displaces the creative imaginative processes that the individual would otherwise supply for him or herself. In children whose creative imagination is still developing, such continuous displacement could have permanent effects on the creative imagination. It is no longer the visual only that is displacing the images that could have been created by the imagination; time, space, interaction and narrative, even presence and being, are now being projected onto us and consumed from the artificial medium, where they are replacing the natural pace and creation of these mental processes within the person. This has much more significant effects on the individual than when only the visual sense is being displaced. The most internal object, the mind, is becoming externalized, nourishing itself falsely from the artificial medium dimensions, and leaving little space for the flourishing of the imagination.

Summary

This chapter has reviewed some of the extant literature on virtual worlds, particularly those aimed at children, as well as the imagination and its development. We have noted that there is a great potential for the use of virtual worlds to harm the development of the creative imagination in the child's developing mind. Furthermore,

we posit that the likely pathway of this harm is that virtual worlds, like television, displace the imagination with ready-made images and narratives. Unlike television, however, virtual worlds further displace the child's imaginary universe, their sense of reality versus fantasy, and their creative and symbolic play. They do this while mimicking the imaginary world that children need to create on their own terms, displacing this experience as well. For this reason, children experience the virtual world not as a construct of their imagination, over which they have control, but as an external reality like any other. This can give rise to serious distortions of normal developing cognitive processes.

We are aware that there is little empirical research to date on the effects of virtual worlds on children's cognitive development, let alone the development of the creative imagination. With this review of the extant literature, and our proposed mechanisms for how virtual worlds disrupt children's normal development, it is our hope to suggest a testable hypothesis, and generate interest in further research. The displacement hypothesis that we herein propose has a long provenance in the literature and is an extension to new media theories for which there is already much empirical support. Healy (1998: 17) reminds us that "[t]echnology shapes the growing mind. The younger the mind, the more malleable it is. The younger the technology, the more unproven it is". The rapid development of new and untested technologies operating on younger and younger minds for longer and longer periods of time is in many ways itself a great experiment, and there seem to be good reasons to believe that it is an ill-conceived one, with potentially serious consequences. Until further research has been done, we conclude that children's storytelling through the use of virtual worlds should not replace more traditional methods of storytelling that more fully engage the child's creative, imaginative, and cognitive processes.

References

- Adams, J., Sutherland, B., Kalb, C. and Raymond, J. (2003, August 25). The end of make believe. *Newsweek*. Retrieved from <http://www.newsweek.com/end-make-believe-135693>.
- Arnheim, R. (1969). *Visual Thinking*. California: University of California Press.
- Aronson, J. N., & Golomb, C. (1999). Preschoolers' understanding of pretense and presumption of congruity between action and representation. *Developmental Psychology* 35(6): 1414–1425.
- Beagles-Ross, J. and Gat, I. (1983). Specific impact of radio and television on children's story comprehension. *Journal of Educational Psychology* 75: 128–137.

- Berson, I. R. and Berson, M. J. (2009). Panwapa: Global Kids, Global Connections. *Social Studies and the Young Learner* 21(4): 28–31.
- Bitarello, M. B. (2008). Another time, another space: Virtual worlds, myths and imagination. *Journal for Virtual World Research* 1(1): 1–18.
- Britsch, S. (1992). *The Development of Story Within the Culture of Preschool*. Berkeley: University of California Press.
- Cash, H., Rae, C., Steel A. and Winkler, A., (2012). Internet Addiction: A Brief Summary of Research and Practice. *Current Psychiatry Reviews* 8(4): 292–298.
- Castronova, E. (2005). *Synthetic Worlds: The Business and Culture of Online Games*. Chicago: University of Chicago Press.
- Chmielewski, D. C. and Pham, A. (2008, January 28). Disney Adds Fantasy Lands. *L.A. Times*, C1.
- Club Penguin (2015). *Membership*. Retrieved on September 9th, 2016, from <https://secured.clubpenguin.com/membership/US>
- Cobb, E. (1977). *The Ecology of Imagination*. New York: Columbia University Press.
- Cohen, D. and MacKeith, S. A. (1991). *The Development of Imagination: The Private Worlds of Childhood*. London: Routledge.
- Conway, F. and Siegelman, J. (1978). *Snapping*. Philadelphia: J. B. Lippincott.
- Cooper, P. J., Collins. R. and Saxby, M. (1992). *The Power of Story*. Melbourne: MacMillan.
- Dellinger-Pate, C. and Conforti, R. J. (2010). Webkinz as Consumerist Discourse: A Critical Ideological Analysis. In Berson, I. R. and Berson, M. J. (eds.). *High Tech Tots: Childhood in a Digital World* (pp. 249–270). Charlotte: Information Age Publishing.
- Dubos, R. (1965). *Man Adapting*. New Haven: Yale University Press.
- Egan, K. (1990). *Romantic Understanding*. London: Routledge.
- Eldon, E. (2007, August 1). Disney buys Club Penguin in \$700 million deal – virtual worlds have arrived? *Venture Beat*. Retrieved from <http://venturebeat.com/2007/08/01/disney-buys-club-penguin-in-700-million-deal/>.
- Feldman, D., Csikszentmihalyi, M. and Gardner, H. (1994). *Changing the World: A Framework for the Study of Creativity*. Westport: Greenwood Publishing.
- Gackenbach, J. I. (2006). Video game play and lucid dreams: Implications for the development of consciousness. *Dreaming* 16: 96–110.
- Gackenbach, J. I. (2009). Electronic media and lucid-control dreams: Morning after reports, *Dreaming* 19: 1–6.
- Gackenbach, J. I., Matty, I., Kuruvilla, B., Samaha, A. N., Zederayko, A., Olishefski, J. and von Stackelberg, H. (2009). Video Game Play: Waking and Dreaming

- Consciousness. In Krippner, S. (ed.). *Perchance to Dream* (pp. 239–253). Hauppauge: Nova Science.
- Gackenbach, J., Kuruvilla, B. and Dopko, R. (2009). Video game play and dream bizarreness. *Dreaming 4*: 218–231.
- Gackenbach, J. I., Kuruvilla, B., Dopko, R. and Le, H. (2010). Dreams and Video Game Play. In Columbus, F. (ed.). *Computer Games: Learning Objectives, Cognitive Performance and Effects on Development* (pp. 127–136). Hauppauge: Nova Science.
- Giegerich, W. (1985). *The Nuclear Bomb and the Fate of God: On the First Nuclear Fission*. Dallas: Spring.
- Goldberg, D. A. (1994). Television From Jungian Perspective. *Psychological Perspectives 29*(2): 10–20.
- Goldman, L. R. (1998). *Child's Play*. Oxford: Berg.
- Golomb, C. and Kuersten, R. (1996). On the Transition From Pretense Play To Reality: What Are The Rules Of The Game? *British Journal of Developmental Psychology 14*(2): 203–217.
- Greenfield, P. M. and Beagles-Ross, J. (1988). Radio vs. Television: Their cognitive impact on children of different socioeconomic and ethnic groups. *Journal of Communication 38*(2): 71–92.
- Grimes, S. M. (2015). Playing by the market rules: Promotional priorities and commercialization in children's virtual worlds. *Journal of Consumer Culture 15*(1): 110–134.
- Grimes, S. M. (2015). Configuring the Child Player. *Science, Technology, & Human Values 40*(1): 126–148.
- Grossman, D. and Degaetano, G. (1999). *Stop Teaching Our Kids to Kill*. New York: Crown Publishers.
- Hannaford, J. (2012). Imaginative Interaction with Internet Games. For Children and Teachers. *Literacy 46*(1): 25–32.
- Harris, L. P. (2000). *The Work of the Imagination*. Oxford: Blackwell.
- Healy, J. (1998). *Failure to Connect: How Computers Affect Our Children's Minds – For Better and Worse*. New York: Simon & Shuster.
- Hew, K. F. and Cheung, W. S. (2010). Use of Three-Dimensional (3-D) Immersive Worlds in K-12 and Higher Education Settings: A Review of the Research. *British Journal of Educational Technology 41*(1): 33–55.
- Hunter, D. (2003). Cyberspace as Place and the Tragedy of the Digital Anticommons. *California Law Review 91*(2): 439–519.
- Jabs, C. (2009, February 1). Talking with Your Children About Online Avatars: Understanding the Difference Between Imagination and Reality. *Indy's Child*,

- Online Column: Growing Up Online*. Retrieved from http://www.indyschild.com/Articles-i-2009-02-01-230763.112112_Talking_With_Your_Children_About_Online_Avatars.html.
- Jenkins, C. (2009, June 26). Your Own Virtual World: Play God – Be God (Even If It's Only Electronically). *Articlesbase: Free Online Articles Directory*. Retrieved from <http://www.articlesbase.com/computer-games-articles/your-own-virtual-world-996244.html>
- Jung, C. G. (1933). *Modern Man in Search of a Soul*. London: Harvest Books.
- Kline, S. (1989). Limits to the Imagination: Marketing and Children's Culture. In Angus, I. and Jhally, S. (eds.). *Cultural Politics in Contemporary America* (pp. 299–316). New York: Routledge.
- Kuss, J. D., Griffiths D. M., Karila, L. and Billieux, J. (2014). Internet Addiction: A Systematic Review of Epidemiological Research for the Last Decade. *Current Pharmaceutical Design* 20(25): 4026–4052. Kzero (2013). Virtual World and MMO Universe Chart: Tween/Teen segment for Q3 2013. Retrieved from <http://www.kzero.co.uk/blog/category/kidstween-worlds/>.
- Lang, A., Dhillon, K. and Dong, Q. (1995). The effects of emotional arousal and valence on television viewers' cognitive capacity and memory. *Journal of Broadcasting and Electronic Media* 39(3): 313–327.
- Lastowka, G. F. and Hunter, D. (2004). The Laws of the Virtual Worlds. *California Law Review* 92(1): 3–73.
- Latham, C. L. (2003). *High Tech Image Influences On Development Of Young Children's Imaginative World Making*. Dissertation Abstracts International: Section B: The Sciences and Engineering Vol. 63(7-B), 3495 [ProQuest].
- Levin, D. E. and Rosenquest, B. (2001). The increasing role of electronic toys in the lives of infants and toddlers: Should we be concerned? *Contemporary Issues in Early Childhood* 2(2): 242–247.
- Lillard, A. (2002). Just through the looking glass: children's understanding of pretense. In Mitchell, R. W. (ed.). *Pretending and Imagination in Animals and Children* (pp. 102–114). Cambridge: Cambridge University Press.
- Mallan, K. (1991). *Children as Storytellers*. Newtown, Sydney: Primary English Teaching Association.
- Mander, J. (1978). *Four Arguments for the Elimination of Television*. New York: Perennial.
- Marsh, J. (2010). Young Children's Play in Online Virtual Worlds. *Journal of Early Childhood Research* 8(1): 23–39.
- Matte, C. (2016). Virtual Worlds for Kids: Pretend Play Online. *About.Com: Family Computing*. Retrieved on September 6th, 2016 from <http://familyinternet.about.com/od/websites/tp/virtualworldskids.htm>.

- McLuhan, M. (1964). *Understanding Media: The Extensions of Man*. Toronto: Toronto University Press.
- McGonigal, J. (2011). *Reality is Broken, Why Games Make Us Better and How They Can Change the World*. New York: Penguin Press.
- Meline, C. W. (1976). Does The Medium Matter? *Journal of Communication* 26(3): 81–89.
- Meringoff, L. K. (1980). Influence of the medium on children's story apprehension. *Journal of Educational Psychology* 72: 240–249.
- Miller, C. H. (2008). *Digital Storytelling: A Creator's Guide to Interactive Entertainment*. Boston: Focal Press/Elsevier.
- Misson, R. (2000, April 8–10). Imagination, the Individual and the Global Media. *Cross-Roads of the New Millennium, Proceedings of the Technological Education and National Development (TEND) Conference 2nd*, held in Abu Dhabi, United Arab Emirates.
- Mitchell, W. R. (2002). Imaginative animals, pretending children. In Mitchell, R. W. (ed.). *Pretending and Imagination in Animals and Children* (pp. 3–22). Cambridge: Cambridge University Press.
- Pearce, J. (1985). *Magical Child Matures*. New York: E. P. Dutton.
- Pearce, J. (1992). *Evolution's End: Claiming the Potential of Our Intelligence*. San Francisco: Harper Collins.
- Peterson, R. J. (1972). Eyes Have They, But They See Not, A Conversation With Rudolf Arnheim About a Generation That Has Lost Touch With Its Senses. *Psychology Today*, June 1972: 55–58.
- Piaget, J. (1962). *Play, Dreams and Imitation in Childhood*, Gattegno, C., & Hodgson, F. M. trans. New York: W. W. Norton.
- Plowman, L. (2004). Hey, Hey, Hey! It's Time to Play: Children's Interactions with Smart Toys. In Goldstein, J., Buckingham, D. and Brougere, G. (eds.). *Toys, Games, and Media* (pp. 207–223). Mahwah: L. Erlbaum Associates.
- Raines, S. and Isbell, R. (1994). *Stories: Children's Literature in Early Education*. New York: Delmar Publishers.
- Rideout, V. J., Vandewater, E. A. and Wartella, E. A. (2003). *Zero To Six: Electronic Media In The Lives Of Infants, Toddlers And Preschoolers*. Henry J. Kaiser Family Foundation. Retrieved September 6th 2016 from <https://www.dcmp.org/caai/nadh169.pdf>
- Rogers, C. R. (1959). Toward a Theory of Creativity. In Anderson, H. H. (ed.). *Creativity and its Cultivation*. New York: Harper.
- Rogers, J. (2008). A passive approach to regulation of virtual worlds. *George Washington Law Review* 76(2): 405–425.

- Rosen, C., Schwebel, D. and Singer, J. L. (1997). Preschoolers' Attributions of Mental States in Pretense. *Child Development* 66: 1133–1142.
- Salomon, G. (1984). Television is “Easy” and Print is “Tough”: The Differential Investment of Mental Effort as a Function of Perceptions and Attributions. *Journal of Educational Psychology* 76: 647–658.
- Sanchez-Vives, M. V. and Slater, M. (2005). From presence to consciousness through virtual reality. *Nature Reviews. Neuroscience* 6(4): 332–339.
- Schwebel, D., Rosen, C. and Singer, J. L. (1999). Preschoolers' Pretend Play and Theory of Mind: The Role of Jointly-Conducted Pretense. *British Journal of Developmental Psychology* 17: 333–348.
- Shiner, R. L., Masten, A. S. and Roberts, J. M. (2003). Childhood Personality Foreshadows Adult Personality and Life Outcomes Two Decades Later. *Journal of Personality* 71(6): 1145–1170.
- Silvey, R., & MacKeith, S. (1988). The paracosm: A special form of fantasy. In Morrison, D. C. (ed.). *Organizing Early Experience: Imagination and Cognition in Childhood* (pp. 173–197). Amityville: Baywood.
- Singer, D. G. and Singer, J. L. (1990). *The House of Make-Believe*. Cambridge: Harvard University Press.
- Singer, D. G. and Singer, J. L. (2001). *Make-Believe: Games and Activities for Imaginative Play*. Washington, DC: American Psychological Association Books, Imagination Press.
- Singer, D. G. and Singer, J. L. (2005). *Imagination and Play in the Electronic Age*. Cambridge: Harvard University Press.
- Singer, J. L. (1975). *The Inner World of Daydreaming*. New York: Harper & Row.
- Singer, J. L. (1975). Navigating the stream of consciousness: Research in day-dreaming and related inner experience. *American Psychologist* 30: 727–738.
- Singer, J. L., Singer D. G. and Rapaczynski, W. (1984). Children's imagination as predicted by family patterns and television viewing: A longitudinal study. *Genetic Psychology Monographs* 110: 43–69.
- Smahel, David, Blinka, L. and Ledabyl O. (2007). *MMORPG Playing of Youths and Adolescents: Addiction and its Factors*. Vancouver: Association of Internet Researchers, *Internet Research 8.0: Let's Play*. Retrieved September 6th, 2016 from <http://www.muni.cz/research/publications/726643>.
- Smilansky, S. (1986). *The Effects of Sociodramatic Play on Disadvantaged Preschool Children*. New York: Wiley.
- Smolen, W. (2012, December 5). Making it to the Top: Tweens Rule the Virtual Worlds Space. *Kidscreen*. Retrieved from <http://kidscreen.com/2012/12/05/making-it-to-the-top-tweens-rule-the-virtual-world-space/>.

- Spiegel, A. (2008, February 21). Old Fashioned Play Builds Serious Skills. *National Public Radio*. Retrieved from <http://www.npr.org/templates/story.php?storyId=19212514>
- Subrahmanyam, K. (2009). Developmental implications of children's virtual worlds. *Wash. & Lee L. Rev.* 66: 1065–1083.
- Superdata. (2013, September 11). World of Warcraft is thinking of microtransactions, and that's a good thing. Retrieved from <http://www.superdataresearch.com/blog/wow-microtransactions/>.
- Tüzün, H., et al. (2009). The effects of computer games on primary students' achievement and motivation in geography learning. *Computers and Education* 52(1): 68–77.
- Ulanov, B. and Ulanov, A. (1991). *The Healing Imagination*. New Jersey: Paulist Press.
- Valkenburg, P. M. and van der Voort, T. H. (1994). Influence of TV on Daydreaming and Creative Imagination: A Review of Research. *Psychological Bulletin* 116(2): 316–339.
- Vibbert, M. M. and Meringoff, L. K. (1981). Children's production and application of story imagery: A cross-medium investigation (Tech. Rep. No. 23). *Project Zero*. Cambridge, MA: Harvard University. (ERIC Document Reproduction Service No. ED 210 682).
- Vygotsky, L. S. (1978). Interaction between learning and development. In Vygotsky, L. S. (ed.). *Mind in society: The development of higher psychological processes* (pp. 79–91). Cambridge: Harvard University Press.
- Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian and East European Psychology* 42(1): 7–97 (English translation 2004, M.E. Sharpe, Inc., from the Russian text *Voo Brazhenie i tvorchestvo v detskom vozraste* (Moscow: Prosveshchenie, 1967)).
- Wadley, M. and Benda, P. (2007). Speaking in Character: Using Voice-Over-IP to Communicate Within MMORPGs. IE '07 Proceedings of the 4th Australasian conference on Interactive entertainment, Working Paper.
- Walton, K. L. (1990). *Mimesis as Make-Believe*. Cambridge: Harvard University Press.
- Wang, C. X., Berson, I. R., Jaruszewicz, C., Hartle, L. and Rosen, D. (2010). Young children's technology experiences in multiple contexts. In Berson, I. R. and Berson, M. J. (eds.). *High Tech Tots: Childhood in a Digital World* (pp. 23–48). Charlotte: Information Age Publishing.
- Watkins, M. (1990). *Invisible Guests: The Development of Imaginal Dialogues*. Boston: Sigo Press.

- Watters, A. (2010, October 1). Number Of Virtual World Users Breaks 1 Billion, Roughly Half Under Age 15. *Redwriterweb.com*. Retrieved from http://www.redwriteweb.com/archives/number_of_virtual_world_users_breaks_the_1_billion.php.
- Webb, E. (1980). Images Of Television: Some Reflections. *Use of English* 32(1): 10–17.
- White, P. (2012, October 29). Kids Virtual Worlds. *TBivision*. Retrieved from <http://tbivision.com/highlight/2012/10/kids-virtual-worlds/19038/>.
- Winnicott, D. W. (1971). *Playing and Reality*. Tavistock Publication.
- Wittgenstein, L. (1992). Last Writings on the Philosophy of Psychology. *The Inner and the Outer*, Vol. 2. Oxford: Blackwell, 1949/199.
- Wulff, S. B. (1985). The symbolic and object play of children with autism: A review. *Journal of Autism and Development Disorder* 15: 139–48.

