PLAY AS A LEADING ACTIVITY FOR CHILDREN IN A DIGITALLY-MEDIATED ENVIRONMENT IN THE HOME SETTING

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ABSTRACT

This research investigated play as a leading activity for children in a digitally-mediated environment in the home setting. Specifically, it explored how two separately located 7- to 8-year-old girls, who are friends in the real world, engaged in sociodramatic play with each other by interacting as avatars in the same online virtual world environment whilst synchronously using video communication tools to discuss their play. Underpinned by interpretivist philosophical assumptions and informed by the cultural-historical approach to research, this inquiry employed a qualitative single-case study design to gain insight into the unique nature of this contemporary form of play. Drawing on the cultural-historical theoretical concept of *play as a leading activity*, the research examined and analysed how children in separate home settings, located within the same regional city in Victoria, Australia, used their imagination to give rise to sociodramatic play in a contemporary context through networked digital technologies. This process enabled theoretical insight to be gained into specific psychological benefits afforded by this play practice to better inform parents about recognising the potential for virtual world gameplay via video chat to support children's cognitive developmental outcomes. Findings emerging from this investigation were used to describe the defining features and fundamental characteristics of play as a leading activity in a digitally-mediated environment. Important factors influencing children's ability to engage in this contemporary form of play in the home setting were also identified.

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LIST OF ABBREVIATIONS

ACARA	Australian Curriculum, Assessment and Reporting Authority
ACU HREC	Australian Catholic University Human Research Ethics Committee
ECA	Early Childhood Australia
ESL	English as a Second Language
HASS	Humanities and Social Sciences
MMS	Multimedia messaging service
NAEYC	National Association for the Education of Young Children
NPC	Non-player character
NHMRC	National Health and Medical Research Council
ZPD	Zone of proximal development

STATEMENT OF AUTHORSHIP AND SOURCES

This thesis contains no material that has been extracted in whole or in part from a thesis that I have submitted towards the award of any other degree or diploma in any other tertiary institution.

No other person's work has been used without due acknowledgement in the main text of the thesis.

All research procedures reported in the thesis received the approval of the relevant Ethics/Safety Committees (where required).

Signed: 

Date: 08/06/2021

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Chapter 1 Introduction

Introduction

In this chapter, background information relating to the phenomenon under investigation, and the contemporary context in which it manifests, is explored. The aim of this study is explained and the research question is introduced. Key terms used in this investigation are defined and the scope of the research is established. The significance of new knowledge emerging from this study is considered. The chapter concludes with a summary of the structural components of this thesis.

1.1 Context of the study

Children's widespread use of digital technologies is a revolutionary phenomenon unseen in past generations. Recent research suggests the use of digital technologies by children in technologically advanced societies is becoming part of their everyday lives (Danby, Fleer, Davidson, & Hatzigianni, 2018; Smahelova, Juhová, Cermak, & Smahel, 2017). Most modern forms of digital technologies, such as touchscreen tablets and smartphones, are internet enabled, meaning children who use these devices can access networked, online spaces.

Access to the internet has significantly transformed the lived experience of childhood (Chaudron, Di Gioia, & Gemo, 2020; Huber, Highfield, & Kaufman, 2018; Jones & Park, 2015) and given rise to online forms of play (Burke, 2013; Marsh, 2010). One emerging online play practice sees children using networked digital technologies synchronously to engage in play with separately located peers. This contemporary, unique activity has prompted a shift from play in real-world, physical spaces to play in online, immaterial spaces and indicates opportunities for play have become unbounded by geographical and material constraints. This research explored how children in separate home settings engaged in play in the same online space through the synchronous use of networked digital technologies.

1.1.1 Personal orientation to the research

My interest in the research topic stemmed from observing the play practices enjoyed by two of my daughters in our home over the past several years. In 2016, I overheard my 12-year-old daughter, Rose (pseudonym) seemingly talking to herself whilst playing the digital game Minecraft® on her iPad®. Upon closer inspection, I noticed she was synchronously using the FaceTime® video chat software platform via her iPod Touch® (a smaller version of an iPad) to engage in face-to-face verbal discourse with a non-school friend from her Taekwondo class, Leah (pseudonym). Leah, also aged 12-years-old, was physically located in her own home on the other side of town. I watched as the two girls discussed their in-world gameplay via video chat whilst interacting as avatars within the same online space: a virtual world environment. I was pleasantly surprised by this unconventional playdate organised by the girls themselves. This soon became a regular free time online play activity for Rose and Leah, often planned during Taekwondo classes (in the real world).

On one occasion, during in-world play, Rose's avatar was 'introduced' to an avatar controlled by one of Leah's classmates, Katie (pseudonym). Soon after, Rose and Katie–who had never met in the real world–started to engage in this online play practice together. As it turned out, Katie had a younger sister, Sam (pseudonym), who, at 8-years-old, was the same age as my youngest daughter, Beth (pseudonym). Rose and Katie guided Beth and Sam to set up their own networked digital devices so they could engage in this play practice also. The girls have all since met in the real world through numerous playdates. Although Rose (now aged 16) no longer engages in this online play practice, Beth (now aged 12) continues to enjoy playing in virtual worlds via video chat with several of her school friends and, of course, her 'internet best friend', Sam. As a parent, I was intrigued by the play practices of these girls, and as a former primary school teacher, now researcher, I was keen to explore the learning potential of this contemporary online play practice.

1.1.2 Children's playful use of digital technologies in the home

The current generation of children is using portable, easy-to-use digital technologies creatively and confidently for a range of purposeful activities (Burnett, 2016). In the familial home setting, children learn to manipulate and interact with various forms of digital technologies, often through joint participation with parents and/or siblings, leading to acquisition of a broad range of digital competences and skills (Chaudron et al., 2020; Huber et al., 2018). Many parents view the presence of digital technologies in the home as a 'natural' part of children's everyday environments (Smahelova et al., 2017) prompting a need for deeper insight into their use by children outside formal learning environments (Kervin, Verenikina, & Rivera, 2018; Straker, Zabatiero, Danby, Thorpe, & Edwards, 2018).

The home setting is recognised as an important context for digital forms of play to manifest (Kervin, Verenikina, & Rivera, 2015). Widespread access to and use of digital technologies in the home has transformed the play practices of the current generation of children suggesting digital forms of play are no longer distinct from traditional forms of play (Stephen, Edwards, & European Early Childhood Education Research Association, 2018). The playful use of digital technologies by children, particularly those in the early childhood years (birth to 8-years-old), has heightened the necessity for insight to be gained into the types of digital games children are using and how children are engaging in activities offered by specific digital gaming platforms.

Research suggests digital forms of play have the potential to shape children's imaginative thought and inspire different types of visual imagery and ideas in new and creative ways (Mustola, Koivula, Turja, & Laakso, 2018). Therefore, it is important to explore the types of play experiences children are encountering when they use digital games so deeper insight is gained into how these activities might enrich imaginary forms of play (Kervin et al., 2015). Such insight contributes to a better understanding about how the psychological process of imagination is developing in contemporary contexts (Edwards, 2011). A significant component of this investigation involved a

detailed examination of how children in this research used their imagination to give rise to a digital form of play in an online space.

1.1.3 Emergence of digital forms of play in online spaces

Since the turn of this century, increasing numbers of children under 8-years-old are accessing the internet (Chaudron et al., 2020; Jones & Park, 2015). Subsequently, engaging in digital forms of play in online spaces has become popular with many children in this age group (Kargin, 2018; Reich, Black, & Korobkova, 2014; Wohlwend, Vander Zanden, Husbye, & Kuby, 2011). Online spaces have been referred to as "playgrounds of the 21st century" (Burke, 2013, p. 58) and "digital backyards" (Dezuanni, 2018, p. 240) as they offer playful and communicative opportunities for co-located and/or separately located children to interact with each other (Dezuanni, O'Mara, & Beavis, 2015). The online world is increasingly permeating the lives of many children and has evolved into a "diverse, interactive space that blurs the boundaries between the real and imaginary, or virtual world, in ways that we never could have envisioned" (Jones & Park, 2015, p. 4). It is important to understand children's online behaviour because the activities in which children engage in online spaces are often unique and can lead to different kinds of outcomes (Smahelova et al., 2017).

While several studies indicate digital forms of play in online spaces share common attributes with traditional forms of play in real-world spaces (Black & Reich, 2012; Lane & Yi, 2017; Marsh, 2010; Merchant, Gillen, Marsh, & Davies, 2012), insight into the capacity to which these manifest remains largely unexplored. "Interactions with and use of space is central to play" (Kervin et al., 2015, p. 232) and while much is known and understood about co-located children's play activities in real-world spaces, such as social pretend play (Göncü, 1993) and rules-based games (Johnson, 2006), current understandings about how separately located children play together in online spaces is limited. This suggests a gap in the knowledge about how separately located children engage in play in online spaces through the synchronous use of networked digital technologies.

1.2 Aim of the study

This investigation aimed to gain insight into how networked digital technologies facilitated a contemporary form of play for children in separate home settings. Current theoretically-based understandings about traditional forms of play evolved prior to the digital age and, subsequently, do not make reference to the ubiquitous presence of digital technologies in children's everyday lives. Such theories, however, can be used to inform contemporary understandings about how children's playful engagement in online spaces shape their psychological development and learning (Jones & Park, 2015). In this research, theoretically-based understandings about traditional forms of play were used to understand the nature of an online form of play in a contemporary context.

1.2.1 Definitions of key terms

The online play practice under investigation in this research was based on a traditional form of play widely recognised as *sociodramatic play*. From a cultural-historical theoretical perspective, sociodramatic play suitably represents a form of play regarded as the most important activity leading development of preschool and early school age children's central psychological functions (Bodrova & Leong, 2015; Karpov, 2005; Vygotsky, 1978). Subsequently, in this research, the theoretical concept of *play as a leading activity* was used to inform understandings about the nature of sociodramatic play in a contemporary context through a cultural-historical lens. Play as a leading activity (sociodramatic play) is defined as play where children adopt roles and create rule-bound imaginary play situations using symbolic actions, objects, and language (El'Konin, 2005a).

In order to engage in play as a leading activity in an online space, children participating in this investigation required access to a *digitally-mediated environment* in their separate home settings. In this research, a digitally-mediated environment is defined as one in which networked digital technologies are used by people in different physical locations to engage in collaborative, meaningful interactions. The networked digital technologies used by children in this study were equipped with two specific software platforms: a *virtual world* and a *video communication tool*.

The first software platform, a virtual world, is defined as an immersive two- or three-dimensional simulated online space (Marsh, 2010), such as Minecraft® or Roblox®, where users represent themselves as customisable, visually embodied icons, known as *avatars* (Gillen & Merchant, 2012). In virtual world environments, children adopt roles (e.g., miners) and perform virtual actions (e.g., dig for diamonds in an underground cave) using symbolic, immaterial objects (e.g., pickaxes). A visual example of a user role-playing a miner holding a pickaxe in an underground cave in the virtual world Minecraft is represented in Figure 1.1. This image is derived from the researcher's personal family account and does not represent data generated in this study.

Figure 1.1. An example of a user role-playing a miner holding a pickaxe in a Minecraft underground cave.

The second software platform required to facilitate online sociodramatic play for children in this research was a video communication tool. Video communication tools are audio-visual online applications, such as FaceTime® or Skype®, that enable real-time social exchanges, known as *video chat*, between separately located users (Tarasuik & Kaufman, 2017). Video chat facilitates children's ability to verbally articulate aspects of their play experiences and interactions as avatars within the same virtual world environment whilst physically situated in separate locations.

1.2.2 Research question

Traditionally, children's ability to engage in play as a leading activity was dependent on and structured around material elements within the context of the play, such as the real-world physical

environment and the tangible objects available within this environment. Digitally-mediated environments, however, now present opportunities for children in different locations to engage in play as a leading activity in a contemporary context through the synchronous use of virtual world technology and video communication tools. Currently, little is known about this contemporary form of play. The research question guiding this study is:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

1.2.3 Scope of the research

Children involved in this research were physically situated in separate home settings within the same regional city in the Australian state of Victoria. The research focused on children in the early school years (aged 7- to 8-years-old) who regularly engaged in virtual world gameplay via video chat with a separately located peer. This age group was selected because 7- to 8-year-old children are more likely to engage in virtual world gameplay than younger children (Mavoa, Carter, & Gibbs, 2017) and most children of this age are capable of expressing themselves verbally and independently using familiar digital devices in the home (Chaudron et al., 2020). These factors were highly significant in contributing to the success of the methodological approach adopted in this study.

1.3 Significance of the study

New knowledge emerging from this research will inform current understandings about the nature of a contemporary form of sociodramatic play for children in separate home settings using networked digital technologies synchronously. This knowledge will assist parents to recognise the potential for digital forms of play to support children's cognitive developmental outcomes.

1.3.1 Understanding digital forms of play

Exploring the unique nature of digital forms of play is important because the likelihood of increasing numbers of children in future years engaging in play through digital technologies in the home is highly plausible (Isikoglu Erdogan, Johnson, Dong, & Qiu, 2019). Findings emerging from

this investigation will make a significant contribution to new knowledge about the nature of online sociodramatic play. While attributes of traditional forms of children's sociodramatic play are long-established and well documented, little is known about what online sociodramatic play looks like for separately located children using networked digital technologies.

This research will also build on current theoretically-based conceptualisations of 'digital play'. While this term is often used to describe a wide range of children's playful activities in a variety of digital contexts, Fleer (2016) argues it is important to examine how such activities reflect fundamental characteristics of traditional play types to effectively determine the "theoretical essence of digital play" (p. 86). This can be problematic for online sociodramatic play, however, as some virtual world game designs position users to adopt certain roles (e.g., 'hero' or 'carer') that significantly influence children's activities and interactions during in-world play (Hafner, 2015).

Investigating how children use digital technologies at home for play opportunities is highly merited considering the unique nature of digital forms of play compared to traditional forms of play (Kervin et al., 2015). In this research, the cultural-historical theoretical concept of play as a leading activity was used to gain insight into the nature of online sociodramatic play. By drawing on this concept to inform this study, psychological benefits reaped by children engaging in this form of play, as theorised by cultural-historical scholars such as Vygotsky (2016), El'Konin (2005b), and Leontyev (2009), were re-examined in a contemporary context.

1.3.2 Informing parents about digital forms of play

In the home setting, parents are instrumental in shaping and influencing children's experiences with digital technologies (Dong, 2018; Isikoglu Erdogan et al., 2019; Jones & Park, 2015). Moreover, management strategies and regulatory practices (e.g., screen time scheduling) implemented by parents in the home significantly affects children's ability to access digital technologies in their everyday lives (Chaudron et al., 2020; Sergi, Gatewood, Elder, & Xu, 2017). For example, studies indicate parents are more likely to actively restrict and control young

children's access to digital devices in the home if they hold negative views about digital forms of play (Van Petegem, de Ferrerre, Soenens, van Rooij, & Van Loo, 2019) and if they (Dias et al., 2016), or their children (Smahelova et al., 2017), lack digital skills.

Recently, concerns have been raised about how the widespread use of digital devices by children might impact their development. For example, some parents are concerned digital forms of play hinder children's imaginative thought (Chaudron et al., 2020), impede learning (Dong, 2018), and inhibit social interactivity (Genc, 2014; Sergi et al., 2017). Negative discourse surrounding children's use of digital technologies could result in children having reduced access to these types of devices in the home thus constraining their ability to use digital devices in ways that promote favourable and efficacious developmental outcomes (Mustola et al., 2018).

Several scholars assert it is vital parents, educators, and researchers are informed about the nature of digital gaming platforms used by children and how these might support child development (Dong, 2018; Lane & Yi, 2017; Zabatiero, Straker, Mantilla, Edwards, & Danby, 2018). This research will inform parents about recognising the potential for networked digital technologies to facilitate a cognitively beneficial form of play for children in separate locations. This information will encourage and promote a "better uptake of family practices that support children's . . . developmental outcomes" (Straker et al., 2018, p. 302). Informing parents about cognitively beneficial forms of play in online spaces is important because research suggests many parents are unclear about how to use digital technologies in ways that foster children's cognitive development (Dias et al., 2016; Ebbeck, Yim, Chan, & Goh, 2016; Isikoglu Erdogan et al., 2019; Kervin et al., 2018; Straker et al., 2018).

1.4 Structural components of thesis

This research seeks to explore a contemporary form of sociodramatic play for separately located children using networked digital technologies. The topic of this research is identified as:

> Play as a leading activity for children in a digitally-mediated environment in the home setting.

In Chapter 2, scholarly literature relating to the research topic is reviewed. Long-established knowledge about traditional forms of sociodramatic play in the early childhood years (birth to 8-years-old) is explained and parental perspectives about young children's use of digital technologies is examined. Current understandings about how digitally-mediated environments facilitate contemporary forms of children's play is explored. The chapter concludes by considering the synchronous use of virtual world technology and video communication tools as effectively facilitating a contemporary form of sociodramatic play for separately located children.

In Chapter 3, the theoretical framework underpinning this investigation is identified. Background information regarding the cultural-historical theoretical concept of *leading activities* is explored and discussed in relation to this research. The specific theoretical concept informing this study, *play as a leading activity*, is clarified and explained. Information describing how the psychological formation of imagination gives rise to this form of play is provided. The chapter concludes by recognising potential psychological benefits reaped by children engaging in play as a leading activity in a digitally-mediated environment through a cultural-historical lens.

In Chapter 4, philosophical assumptions underpinning this study are explained and the research approach adopted to guide the methodology of this investigation is identified. The research design is clarified and the participant selection process is detailed. Data collection and analysis methods used in this study are explained and justified. A consideration of ethical implications arising from this research is provided and an examination of factors contributing to the rigour, risks, and limitations of this study are outlined.

In Chapter 5, the research context is described and information about the child participants, and their online play episodes, is provided. Important factors influencing children's ability to engage in online sociodramatic play through networked digital technologies are identified. Findings from analysed data are reported according to ways children combine and rework aspects of reality with imagination to give rise to play as a leading activity in a digitally-mediated environment.

In Chapter 6, the research question is addressed through a richly detailed description of the defining features and fundamental characteristics of play as a leading activity in a digitally-mediated environment. Factors facilitating or restricting this activity are identified and described as 'levers' that enable or constrain children's ability to engage in this contemporary form of play. Levers relating to findings emerging from this investigation and the scholarly literature are combined to inform parents about how to effectively facilitate online sociodramatic play for separately located children using networked digital technologies

In Chapter 7, a concluding synopsis of this research is outlined. Information is provided describing how the aim of this study was addressed and how the research question was answered. Key findings emerging from this investigation are summarised in terms of how new knowledge embedded within each finding makes a significant contribution to deepening current understandings about the nature of online sociodramatic play. Practical implications and recommendations arising from this research are explored and limitations relating to this study are identified. A vignette detailing personal reflections of the researcher and a summation of the overall significance of this investigation conclude this chapter.

Conclusion

In this chapter, background contextual information about the topic of this research was provided. The aim of this study was recognised as seeking to gain insight into what play as a leading activity looks like for children in a digitally-mediated environment in the home setting. Key terms used in this study were defined, the research question was identified, and the scope of this investigation was established. The chapter concluded by considering the significance of new knowledge emerging from this study and outlining a sequential summary of the main structural components within this thesis. In the next chapter, a review of the scholarly literature will provide insight into current understandings about the nature of children's play in real-world and online spaces.

Chapter 2 Literature Review

Preamble

The scholarly literature informing this review was initially garnered from recently published empirical research studies investigating children's contemporary use of virtual world technology and video communication tools. Search terms during this inceptive phase of the inquiry combined the identifying term *children* with words and phrases such as virtual worlds, Minecraft, video communication, video chat, Skype, and FaceTime. Much of the literature accumulated from these searches elicited journal articles and book chapters reporting on children's separate use of virtual world technology and video communication tools in specific settings, such as homes and formal learning environments.

The next step was to explore long-established published writings describing traditional forms of children's social pretend play by including the base word *play* with connecting terms such as imaginary, sociodramatic, symbolic, make-believe, and leading activity. Play-related terms were also combined with key phrases such as *virtual worlds* and *video communication tools* to locate published studies reporting on children's playful, interactive use of these software platforms. The final step involved an examination of recent scholarly articles exploring parental views of digital forms of play by combining *parent*s and *digital technologies* or *digital devices* with terms such as perspectives, views, and perceptions.

Relevant search terms and phrases were entered into a range of online databases, including the publicly accessible Google Scholar, and those requiring private access through an educational institution. Peer reviewed journal articles were located using the online databases EBSCO, ProQuest Central, SAGE journals, SpringerLink Journals, Taylor and Francis Online, and Wiley Online Library. The academic credibility of sourced journal articles was assessed by a cautious examination of the publishing journal's impact factor. Electronic books were accessed through online publishing houses including Peter Lang e-books and E-book Central Academic Complete.

Physical materials were borrowed from the Australian Catholic University library. Online searches relating to children's playful, interactive use of digital technologies were further refined by prioritising peer reviewed empirically-based articles and books published during the past ten years, however, scholarly literature regarding traditional forms of social, symbolic play were unrestricted by date of publication. Active filters for peer-reviewed journal articles and physical resources were applied along with the use of Boolean search terms to further modify database searches, for example *virtual worlds* AND *play* OR *children*.

Introduction

This study aimed to contribute new knowledge about the nature of sociodramatic play for separately located children using networked digital technologies. New knowledge emerging from this research will assist parents with making informed decisions about providing opportunities for their children to engage in cognitively beneficial forms of play in online spaces. In adopting this focus, parents will better recognise the potential for specific software platforms to support children's psychological development. This chapter examines the research literature in relation to this focus in three main areas: 1. play in early childhood; 2. digitally-mediated environments, 3. play and digitally-mediated environments. The chapter concludes by considering how play as a leading activity is facilitated by the synchronous use of virtual world technology and video communication tools through a digitally-mediated environment in the home setting.

2.1 Play in early childhood

This section explores the underlying philosophical assumptions of play in early childhood. The concept of play as a leading activity, as viewed through a cultural-historical lens, is explained and examined. A definition and description of what this form of play looks like in traditional, non-digitised settings is provided, including specific reference to how it is exhibited differently in school age children compared to preschoolers. This section concludes by considering contemporary forms of children's play through the use of digital technologies with a particular focus on current understandings about parents' views of digital forms of play.

2.1.1 Philosophical assumptions about play in early childhood

Play is recognised as a naturally spontaneous, flexible, and self-motivated activity expressed using creative actions and thoughts over extended periods of time (Bateson, 2015). The value of play in early childhood (birth to 8-years-old) has long been advocated by developmental theorists as supporting children's cognitive processing in significant, transformative ways (Karpov, 2005). In Vygotsky's (2016) view, when children willingly and voluntarily formulate real-life plans to create action in imaginary situations, they make psychological advancements that determine their ongoing cognitive development. Similarly, Piaget (1999) acknowledged imaginary forms of play as cognitively beneficial for children, as they draw on developing mental schema to create a personal understanding of their real-life experiences. Piaget, however, thought imaginary play reflected a child's previous experiences and cognitive ability, whereas Vygotsky viewed it more as a future-oriented activity that led to development of higher cognitive functions.

Rogoff (1990) offers further insight into Piaget's and Vygotsky's differing perspectives on the psychological developmental shifts occurring when children engage in imaginary play as being fundamentally attributed to "the centrality of their focus on the social versus the individual" (p. 149). While Piaget viewed imaginary play as an intrinsically motivated activity, where each individual child's cognitive development is advanced by drawing on each other's ideas through shared discussion, Vygotsky regarded this shared discussion and decision-making as a joint process where the appropriation of these collaboratively negotiated contributions led to mutual benefits. Essentially, for Piaget, a child's cognitive development leads imaginary play reaping individual benefits, whereas for Vygotsky, verbal communication within imaginary play situations leads development of collective higher mental processing, first on a social level, then later internalised on the individual level.

Despite these differing perspectives, both Piaget and Vygotsky recognised the value of imaginary play experiences in childhood and the importance of sharing perspectives to establish

co-constructed meaning (Rogoff, 1990). While both theorists agree imaginary play represents an interpretation of children's real-life experiences, Göncü and Gaskins (2011) view this form of play as "fundamentally a social activity" (p. 51) as it is jointly constructed by children and their play partners. In accordance with Vygotsky, they assert social forms of imaginary play situations stem from children's real-world social interactions, are structured around the tangible play objects available within a culturally-based social environment, and proceed according to socially interactive negotiations between play partners. In a virtual world, however, play objects and social environments are embedded within the software design prompting claims that children's in-world play is co-constructed with adult creators of the game (Hafner, 2015; Mustola et al., 2018).

2.1.2 Play as a leading activity in early childhood

According to cultural-historical theory, play is the leading activity of preschoolers when children can voluntarily and willingly create and enact imaginary situations using substituted objects, such as placing a stick between the legs to represent a horse (Vygotsky, 1978). As a leading activity, play leads development of essential psychological functions children need to learn and effectively participate in social and cultural situations (Kravtsova, 2006). During this form of play, children demonstrate their "emerging ability to carry on two types of actions, external and internal, internal actions being a defining characteristic of higher mental functions" (Bodrova & Leong, 2015, p. 374). For play to become a leading activity in early childhood, children must be cognitively capable of transforming imaginative thought into action, thus creating a new social situation of development in which they engage in a specific type of verbal communication to maintain a "mutual pretend focus" (Göncü, 1993, p. 191).

For older preschool children and early school age children, play as a leading activity becomes a more "elaborated and developed form of role playing" (El'Konin, 2005a, p. 35) structured according to imaginary role-based and rule-bound scenarios, in which children use symbolic actions, objects, and language over extended periods of time. This form of play, also

referred to as *mature* play (Bodrova & Leong, 2007), is enacted socially, involving two or more children. Play scenarios are established and maintained through the central aspect of adopted role performances of participating children. The roles children adopt guide social interactions among play partners, such as comments and instructions, to control the play situation. This form of play allows children to communicate, develop, and negotiate play plots based on their shared understandings of imaginary play situations.

From a cultural-historical perspective, sociodramatic play represents the type of play regarded as a leading activity (Bodrova & Leong, 2015; Karpov, 2005). Sociodramatic play is identifiable by the following characteristics: imitative role play, make-believe with objects, actions and situations, social interaction, verbal communication, and persistence (Smilansky, 1968, as cited in Marsh, 2010). When children engage in sociodramatic play, they employ mutual intersubjectivity to distinguish meaning from a real-life context to an agreed-on imaginary context. According to Göncü (1993), intersubjectivity during sociodramatic play situations is achieved when play partners construct a shared understanding of the play situation without adult assistance by maintaining a joint focus of attention, using verbal (spoken words) and non-verbal (actions) symbolic representations during play scenarios, and exchanging meta-communication strategies. Meta-communication strategies are verbal and non-verbal language and behaviours children use to co-ordinate, discuss, manipulate, and negotiate imaginary play scripts (Monighan Nourot, 2006). Such strategies are essential in ensuring a shared understanding of the symbolic nature of sociodramatic play situations (e.g., chairs lined up represent a bus) exists between play partners.

By 7- to 8-years-old, most children have developed more sophisticated communicative, cognitive, and social skills than their younger counterparts resulting in sociodramatic play episodes that are multi-dimensional, highly collaborative, and strategically constructed (Johnson, 2006). Piaget (1999) acknowledged that “when older children play real parts . . . symbolism is greatly improved as compared with that which satisfies the younger child” (p. 112) and considered children

aged 7- to 12-years-old more capable of co-operating with each other and co-ordinating different points of view during sociodramatic play. Vygotsky (2016) also recognised a shift in sociodramatic play for older children and theorised that, for school age children, play becomes internalised, converting to "inner speech, logical memory, and abstract thought" (p. 14) permeating the boundaries between imagination and reality. This enables older childen to independently co-construct and enact sociodramatic play scenarios in any situation using more sophisticated communication skills than preschoolers and internalise generalised actions to reflect a deeper understanding of how to recreate real-life activities within imaginary activities (El'Konin, 2005b).

When school age children engage in sociodramatic play, they exhibit a greater range of behaviours than younger children during the course of the play scenario by controlling the imaginary situation using high-level meta-communication strategies to establish intersubjectivity. Older children have a more developed sense of self and are more socially competent, so their sociodramatic play "demonstrates richer texts, more contoured scripts, and more organised plots than the play of younger children" (Johnson, 2006, p. 16). Interestingly, in some cultures, sociodramatic play peaks in the 6- to 8-year-old age range as these children tend not to create fantasy worlds drawn from unrealised ambitions, but endeavour to recreate adult activities in their play situations, which, in their everyday lives, they are "beginning to master through legitimate participation" (Göncü & Gaskins, 2011, p. 10). Moreover, by school age, children are capable of de-contextualising meaning from actions and objects and rely less on the physically substituted objects used by preschoolers. They still, however, require materialised pivots such as costumes (e.g., a towel is a magician's cape) and/or props (e.g., a stick is a magic wand) to represent meaning within sociodramatic play situations (Duncan & Tarulli, 2003).

2.1.3 Parents' views on digital forms of play in early childhood

In the current digital age, increasing numbers of children in the early childhood years are using digital technologies for play opportunities in the home (Kervin et al., 2018). It is important to

consider parents' views about digital forms of play because parents significantly shape the way children use digital technologies in the home (Chaudron et al., 2020; Dias et al., 2016; Dong, 2018; Sergi et al., 2017). National and international early childhood advocacy organisations offer guidelines to assist parents with making informed decisions about facilitating digital forms of play that support children's cognitive development. In referencing play opportunities, the *Statement on Young Children and Digital Technologies* published by Early Childhood Australia (ECA, 2018) recommends children use digital technologies for play-based opportunities through joint engagement to facilitate collaborative learning. Similarly, in North America, the *Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8* position statement (National Association for the Education of Young Children [NAEYC] and Fred Rogers Center for Early Learning and Children's Media, 2012) recommends the selection of software platforms that facilitate collaborative play, creativity, and learning, suggesting "3D-rendered collaborative games and immersive world environments" (p. 8) potentially present new learning opportunities for children.

Recent research offers insight into parents' views about digital forms of play for children in the early childhood years. A mixed method study surveyed 500 culturally diverse parents from China, South Korea, Turkey, and the United States of America regarding their preferences and beliefs about digital forms of play for 4- to 6-year-old children (Isikoglu Erdogan et al., 2019). Findings indicated most parents from all countries preferred traditional forms of play (e.g., pretend, physical, constructive, rules-based games) to digital forms of play. A key finding emerging from this study suggested parents with higher levels of education were less likely to prefer digital forms of play compared to less educated parents. The authors proposed this result could be attributed to more educated parents assimilating literature cautioning them about young children's use of digital technologies.

Interestingly, one of the authors of this study re-evaluated qualitative interview data collected from 13 South Korean parents (Dong, 2018) as parental preferences for digital forms of play in this country were found to be significantly lower than parents from the other three countries. Findings confirmed almost all South Korean parents participating in this study held strong, negative views about digital forms of play with many linking the concept of 'digital play' to children watching online videos and playing basic computer games. Interview data indicated most parents regarded digital technologies as tools that predominantly 'entertained' children, a finding reflected in other recent studies (Chaudron et al., 2020; Dias et al., 2016; Genc, 2014; Sergi et al., 2017). Moreover, while Korean culture highly values education, many parents in this study viewed digital devices as motivational or reward tools for children achieving academic success as opposed to tools that offered potential learning opportunities. Parents allowing children access to digital devices as a 'reward' for good behaviour (e.g., completing homework) was also reported in a study investigating how parents mediate 7- to 8-year-old children's use of digital technologies in the home (Smahelova et al., 2017).

Several studies also offer insight into how parents and educators view the potential for digital technologies to provide learning opportunities for children. A recent survey sought the perspectives of 515 adults working in the Australian early childhood education and care sector, 26% of whom identified as parents, about the use of digital technologies by young children (Zabatiero et al., 2018). Results reported 44% of participants strongly disagreed with the statement, "*Digital technologies have great potential benefits for young children's learning*" (p. 18) compared to 7% who strongly agreed. This represents a significant difference in the perspectives of adults involved with young children about the capacity for digital forms of play to support children's cognitive developmental outcomes.

Similar findings were reported in a survey seeking perceptions of 85 Turkish parents about 3- to 6-year-old children's playful use of smartphones (Genc, 2014). The study found most

respondents held negative views about children's use of digital devices and regarded them negligible to child development. The author of this study, however, considered potential cognitive benefits for children using smartphones by asserting digital forms of play are based on traditional forms of play, where children use their imagination and follow rules, and, once assimilated to this play experience, "make changes to it, affecting their play outcomes and making connections to real life" (p. 58).

Other studies, however, suggest many parents hold positive views about the capacity for digital technologies to provide learning opportunities for children. In a survey of 406 Australian parents with a child under 8-years-old, a significant majority of participants (92%) viewed technological devices (e.g., tablets) as useful learning tools (Huber et al., 2018). Parents' understandings of children's 'educational' experiences with such devices, however, predominantly involved the consumption of content or engagement with rules-based games. The authors highlighted the challenging nature of this finding as it suggested parents considered activities focusing on a "narrow range of specific skills" (p. 827) as 'educational' compared to activities that provide creative, open-ended, interactive play opportunities.

Another recent study found most parents from 58 European families with 6- to 8-year-old children positively viewed digital technologies as useful, educational tools for children (Chaudron et al., 2020). Many parents in this study, however, limited children's access to such devices due to concerns about potential negative social and cognitive effects. The authors proposed this result may stem from the benefits of digital technologies being "poorly understood" (p. 142) by many parents, subsequently leading them to fear negative developmental effects on children and attribute greater value to offline pursuits.

An example highlighting this issue is represented in a vignette of a mother who felt 'disappointed' when she discovered her 7-year-old daughter using an iPad whilst her daughter's visiting 7-year-old playmate played with construction blocks (Kervin et al., 2015). Understandably,

the mother feared the children were not playing together, however, it became apparent they were engaging in a co-constructed imaginary play scenario by simultaneously using an onscreen context (building a structure using immaterial blocks in a virtual world) *and* off-screen context (building the same structure using material construction blocks). This vignette suggests parental concerns about possible negative effects for children using digital technologies potentially hinder and/or constrain children's ability to engage in interactive, cognitively beneficial forms of play in the home.

Moreover, to develop the vignette accurately, the two children involved were asked to describe their play activity to the researchers highlighting the value of including children's perspectives in studies exploring digital forms of play. Research suggests adult-led inquiries seeking children's perspectives can reveal "social and cultural processes in which they are constituted, shaped and formed" (Clavering & McLaughlin, 2010, p. 606) and better inform adults about scaffolding positive experiences for children that support their transitional needs and interests (Farrell, Tayler, & Tennent, 2004).

Parents' limited understandings about using digital technologies to support cognitively beneficial forms of play were also reported in a qualitative study seeking perspectives of 19 Australian parents regarding 3- to 5-year-old children's use of digital technologies in the home (Kervin et al., 2018). Findings indicated while all parents held positive views about the potential for digital technologies to enhance children's play opportunities and support their learning, they were unclear about how this could successfully be achieved, a finding reflected in several other studies (Dias et al., 2016; Ebbeck et al., 2016; Isikoglu Erdogan et al., 2019). The authors concluded parents often receive conflicting guidelines about using digital technologies in ways that support children's cognitive developmental outcomes.

This issue highlights the notion that current 'screen time' recommendations for children are often "oversimplistic" (Straker et al., 2018, p. 302), include "generic, non-context sensitive guidelines" (Mavoa et al., 2017, p. 171), and fail to detail developmental value of children's

experiences with digital media (Huber et al., 2018). Squire and Steinkuehler (2017) argue it is more productive to inform parents about ways digital technologies can be used to support children's developmental outcomes than to regulate children's behaviour by imposing potentially restrictive screen time limits. Similarly, Huber et al. (2018) suggest disentangling the concept of *screen time* from *play time* is difficult "because of the multiple ways in which screen media can promote play" (p. 829).

Parents' uncertainty about potential cognitive benefits for children engaging in digital forms of play was illuminated in a large-scale questionnaire seeking the views of 1,058 parents/caregivers in Singapore (Ebbeck et al., 2016). Participants in this study were asked about the risks and benefits to children under 7-years-old using a range of technological devices such as touchscreen tablets and smartphones. When identifying potential 'risks' for children using these types of devices, 'intellectual development' was identified as the most significant risk by the majority of parents in this study (55%). However, when considering the 'benefits' of such devices, most parents in this study (60%) viewed them as potentially fostering children's cognitive development. Only a minority of parents (14.8%), however, regarded technological devices as providing creative and interactive learning opportunities for children.

Parents negatively viewing the capacity for digital technologies to facilitate interactive play opportunities for children has also been reported in other recent studies. In North America, a qualitative study sought perspectives of five parents living in rural areas regarding 4- to 7-year-old children's use of portable digital devices (e.g., touchscreen tablets) in the home (Sergi et al., 2017). The study found while all parents held positive views about the potential for digital devices to foster learning opportunities for children, they were concerned use of these devices limited children's social interactions. Similar views were held by parents in a study that explored the value Australian parents attach to children's play with digital technologies (McLean & Edwards, 2015). In this investigation, touchscreen devices (iPads) were introduced for families to use during community

playgroup sessions over a three-month period. Prior to the introduction of the iPads, focus group interviews revealed parents were concerned about these devices hindering children's interactivity during playgroup sessions. Follow up interviews, however, revealed a shift in parents' perspectives about children's interactive use of iPads. Rather than promoting solitary play at playgroup, iPads were seen to facilitate social interactions between children and parents. The authors recognised that, by participating in this study, parents' awareness about how to use touchscreen devices to facilitate children's playful interactions was heightened. This study highlights the importance of equipping parents with empirically-based knowledge that assists them with making informed decisions about children's use of digital technologies.

Studies in this section suggest parents' perspectives about digital forms of play in early childhood are diverse. While many parents hold negative views about digital forms of play, others hold positive views and consider digital technologies as providing cognitively beneficial play opportunities for children. Research indicates, however, parents who hold positive views about children's playful use of digital devices are unclear about how these might be used to foster children's psychological development.

Summary

This section identified the cultural-historical theoretical concept of play as a leading activity in early childhood as contributing to development of children's essential psychological functions. Sociodramatic play was recognised as a developed, mature form of play, representative of the type of play considered a 'leading activity' for children from a cultural-historical perspective. Key elements of achieving intersubjectivity during sociodramatic play situations were identified and the sophisticated nature of school age children's sociodramatic play, compared to preschoolers, was clarified. This section concluded by considering children's use of digital technologies as a contemporary form of play in early childhood. A review of recent literature indicated parents hold contrasting views about children's playful use of digital technologies and many are unclear about how digital forms of play might support children's cognitive development.

2.2 Digitally-mediated environments

This section defines and explores the concept of a digitally-mediated environment in the home setting. Virtual world technology and video communication tools are identified as two specific types of software platforms facilitating collaborative, meaningful interactions between people in different physical locations through a digitally-mediated environment. Studies reporting on the separate use of these software platforms by children in different locations are reviewed and analysed.

2.2.1 Digitally-mediated environments in the home setting

Modern forms of networked digital technologies accessible in many homes are often equipped with software platforms that facilitate socially interactive exchanges between people in different physical locations through a *digitally-mediated environment.* In this research, a digitally-mediated environment is defined as one in which networked digital technologies are used by people in different physical locations to facilitate collaborative, meaningful interactions. Digitally-mediated environments are becoming commonplace in the homes of many children in technologically advanced societies (Chaudron et al., 2020; Kervin et al., 2018). Growing up in a home that provides access to a digitally-mediated environment expands children's social worlds as they can interact purposefully and playfully in online spaces with family members and peers in separate locations. Such interactions are enabled through specific software platforms, such as virtual world technology and video communication tools.

2.2.2 Digitally-mediated environments and virtual world technology

One software platform that facilitates collaborative, meaningful interactions between people in different physical locations is virtual world technology. Virtual worlds are immersive, simulated online spaces (Marsh, 2010) graphically represented in various formats enabling users to engage in virtual experiences based on real-life contexts (e.g., riding a horse in Minecraft) and/or imaginary contexts (e.g., flying on a magic carpet in Roblox). In virtual worlds, users navigate in-world

environments through embodiment as avatars. Avatars appear as icons or figures presented as a range of images, human or non-human, and once selected, can be adapted by changing their appearance as configured by the user.

During virtual world gameplay, users skilfully interweave between dual roles of their authentic selves and their projected, performing selves as avatars, by co-ordinating multiple perspectives based on real and virtual embodied identities (Burke, 2013). This involves navigating fantasy landscaped scenarios within a rule-bound and role-based social context while discerning between physical and social realities of in-world virtual play (Burnett & Merchant, 2014). Nardi (2010) describes users' ability to view in-world environments whilst also acting in these in-world environments as a "powerful combination" (p. 8) where the participatory experience of interacting with other users of the game is a "new means of authentic expressive performance, embedded in vivid visual spaces" (p. 93). Similarly, Jones and Park (2015) describe virtual worlds as contemporary cultural tools that hold potential for children to actively participate in authentic socially interactive experiences as "both the real and virtual contexts share similar interactive and cognitive elements" (p. 10).

Virtual world technology is a thriving, popular choice of out-of-school activity for today's generation of children (Beavis, Muspratt, & Thompson, 2015; Dezuanni et al., 2015; Lane & Yi, 2017) where they can adopt roles to interact, communicate, and collaborate with other users, whilst acting within and upon elements of the gameplay. A recent quantitative study into children's play practices using digital technologies outside formal learning environments found the virtual world, Minecraft, was predominantly the most popular choice by 3- to 12-year-old children (Mavoa, Carter, & Gibbs, 2018). The findings noted, however, that in the 6- to 8-year-old age range, girls were significantly less likely to play Minecraft than boys, leading the authors to recommend girls under 8-years-old not be disadvantaged when it comes to potential benefits afforded by engaging in virtual world gameplay.

Virtual worlds have become sites of socialisation for children outside school hours as they are not bound by the limitations of playing in the same physical space (Sarachan, 2013). Burke (2013) suggests when children play as avatars in virtual worlds, they feel free to explore new realms of play opportunities by combining aspects of their real and virtual identities to interact with other like-minded users. Most virtual world software platforms offer in-world text-based chat and/or voice-chat facilities enabling users to communicate with each other during gameplay. Text-based chat, however, restricts meaningful exchanges between players (Reich et al., 2014) and disrupts reciprocal turn-taking systems (Merchant, 2009), and voice-chat prevents the exchange of non-verbal cues. To overcome these limitations, some children use video chat to communicate with separately located peers during virtual world gameplay.

A decade ago, Marsh (2010) highlighted the importance of objectively examining children's use of virtual world online spaces to better inform educators about the nature of this contemporary form of play so an "outright dismissal of its value" (p. 35) could be avoided. In the ensuing years, virtual world software platforms have become increasing popular with children, particularly those accessible through tablet technology. For example, upon the 2011 release of the mobile and touch-screen version of Minecraft, the "number of younger players skyrocketed" (Lane & Yi, 2017, p. 148). While various studies into children's use of virtual world gaming platforms have been conducted with children playing on their own (Hafner, 2015; Sarachan, 2013), and in pairs/groups in the same physical space, such as home settings (Danby, Evaldsson, Melander, & Aarsand, 2018; Dezuanni, 2018), school classrooms (Burke, 2013; Dezuanni et al., 2015), and an after-school club (Wohlwend et al., 2011), research into the use of virtual world technology by children in separate locations is scarce.

Interestingly, Potter and McDougall (2017) argue co-located children engaging in virtual world gameplay are participating in a "social design" (p. 48) that reflects pedagogical elements of Gutiérrez's (2008) conceptualisation of a *third space.* Third spaces are metaphorical arenas that

manifest between multiple social contexts (e.g., home and school) and mediate participatory, collaborative, embodied activities that lead to transformative learning. For example, co-located children might learn in new and productive ways by participating through real (self) and virtual (avatar) embodied identities in a metaphorical space that bridges offline (classroom) and online (virtual world) social contexts. From this perspective, virtual world gameplay via video chat might be considered a networked third space that bridges online (virtual world) and two offline (separate homes) social contexts.

Traditionally, parents and early childhood educators were instrumental in facilitating, scaffolding, and supporting children's engagement in sociodramatic play by assisting them to co-construct imaginary play scenarios in the same physical space (Karpov, 2005; Rogoff, 1990; Vygotsky, 1978). Since the introduction of networked digital technologies, however, "much of children's play construction is supported by media and interaction on virtual world play sites" (Burke, 2013, p. 58). This means virtual world game designers have emerged as significant adult mediators of children's online sociodramatic play experiences thus heightening the need to explore the capacity to which online virtual environments effectively scaffold sociodramatic play experiences for children. This is important because research suggests subscription-based virtual worlds restrict users' access to in-world features and activities (Kargin, 2018; Marsh, 2011) and those offering accrual of in-world currency influences users' motivations and decision-making during gameplay (Burke, 2013; Sarachan, 2013).

2.2.3 Digitally-mediated environments and video communication tools

A second software platform facilitating meaningful, collaborative interactions between people in different physical locations is a video communication tool. Video communication tools (e.g., FaceTime, Skype) have revolutionised the social experience of communicating with individuals or groups anywhere in the world, as they facilitate verbal and non-verbal social interactions via video chat without the need for conversational partners to be in the same physical

space (Kappas & Krämer, 2011). Research indicates video communication tools create a sense of physical co-presence between users when the option of being in the same material space is untenable (Manstead, Lea, & Goh, 2011). More complex interactive communicative processes, however, such as turn-taking and eye gaze, can be somewhat restricted (Austin, Hampel, & Kukulska-Hulme, 2017). Although this form of communication has been widely adopted by adults and teenagers, increasing numbers of children are using video communication tools on a regular basis (Standlee, 2017) at much younger ages than their older counterparts (Tarasuik & Kaufman, 2017) to engage with family members and peers in different physical locations. A recent study reported some children aged between 6- and 8-years-old are capable of autonomously using video communication tools such as FaceTime and Skype to communicate with family members living abroad (Chaudron et al., 2020).

Several studies provide insight into children's use of video communication tools. A qualitative study compared telephone conversations to video communication conversations between children and their grandparents whilst in different physical locations (Ballagas, Kaye, Ames, Go, & Raffle, 2009). The study found video chat better facilitated children's ability to pay attention to the conversation compared to voice chat. Moreover, video chat promoted opportunities for play, enabled children to share perspectives, and facilitated exchange of meaningful non-verbal communication such as body language, gestures, and facial expressions during play-based conversations. A further study analysed synchronous free play interactions between 13 friendship-based child dyads (aged 7- to 8-years-old) in adjacent laboratory rooms equipped with four different video communication tools and a variety of toys (Yarosh, Inkpen, & Brush, 2010). Findings reported video chat facilitated playful engagement between peers, including observations of imaginative play (such as role playing with dolls), however, the physical limitations of the screens hindered children's ability to maintain a joint focus of attention and achieve intersubjectivity, both of which are key to successful sociodramatic play episodes (Göncü, 1993).

One study employed a mixed method approach to analyse asynchronous interactions between 25 fourth graders in North America and 5 sixth graders in Greece using the video communication software platform, VideoPals®, which enabled children to record, send, receive, and reply to video messages (Giannakos, Chorianopoulos, Inkpen, Du, & Johns, 2013). Findings suggested most children preferred video communication to e-mail in terms of enjoyment, ease of use, and usefulness in learning more about their peers. Many child participants also indicated their ability to see each other's emotions expressed through facial expressions and body language as one of the most important benefits of using video communication. Some children, however, reported feelings of anxiety during the session, purportedly due to the restrictive presence of adults facilitating technical aspects of the exchange, interacting with children not known to them in real-life, and disproportionate numbers at either end of the exchange. Additionally, the asynchronous nature of the communication may have restricted authentic turn-taking discourse, hindering children's ability to engage in collaborative, meaningful interactions in real-time.

A more recent study qualitatively analysed conversational interactions between two groups of 12 English as a Second Language (ESL) students (aged 6- to 7-years) using Skype to improve their English language skills in schools located in different European countries (Austin et al., 2017). The study found the Skype software platform enabled children to mediate their conversations to co-construct meaning and share knowledge through spoken language and the use of visual objects, expressive gestures, postures, and eye-gaze. The materiality of the classroom environment also contributed to children's online interactions as their attention shifted between physical and online spaces. Interestingly, although Skype enables access to text-based instant messaging, none of the children chose to use it during the sessions, preferring to rely solely on verbal communication. Findings reported video chat fostered rich opportunities for children to develop oral language and conversational skills, although its limited capacity to support some communicative exchanges, such as eye gaze and gesturing, was identified. The results of these studies highlight the potential for

video communication tools to provide a platform for children in different physical locations to engage in collaborative, meaningful conversations through informal verbal and non-verbal communicative exchange.

2.2.4 Combining different software platforms in digitally-mediated environments

Few studies report on the combined use of different software platforms, such as virtual world technology and video communication tools, in digitally-mediated environments. One study, however, used Short Message Service (SMS) text-messaging to communicate between 18 children (aged 9- and 10-years) in school classrooms and an adult researcher in his home whilst engaging as avatars in the same online virtual world platform (Burnett & Merchant, 2014). Findings reported the use of text messaging to co-ordinate in-world positions of avatars proved problematic and hindered interactivity and connectivity between children and the off-site researcher, who reported feelings of isolation at being located in a separate physical space. Interestingly, after the session, children and the off-site researcher used Skype to verbally reflect on their experiences, a practice that may have assisted with co-ordinating their in-world interactions during gameplay. Using text-messaging to communicate between locations, however, afforded the off-site researcher the embodied experience of operating simultaneously in the virtual *and* material world, something video communication tools offer children in separate locations playing together in the same virtual world.

In a first of its kind, a recent inquiry combined virtual world technology and video communication tools to study the contributing and constraining factors for collaborative learning across real and virtual spaces (Bower, Lee, & Dalgarno, 2017). The research design saw a group of 11–12 co-located adult preservice teaching students at an Australian university synchronously engaging with 10–12 peers (located in individual home settings) within a virtual world environment over two sessions. Audio-visual footage of the group of students in the same physical space was live-streamed to the separately located students who were able to verbally communicate with each other and the co-located students via voice-enabled and text-based chat facilities embedded in the

virtual world platform. Findings reported the multimodal use of technology enabled collaborative exchange, facilitated verbal and non-verbal communication, and promoted a feeling of co-presence and engagement between participants in both the shared space and the individual home settings. For students located in individual home settings, however, difficulties in communicating with the co-located students, due to an inability to read facial cues, disruptive turn-taking patterns, and technical difficulties, was reported. This study suggests the synchronous use of virtual world technology and video communication tools effectively facilitates gameplay between people in different physical locations, however, individual users video chatting with a group of people can be problematic.

Summary

This section described the nature of a digitally-mediated environment, with specific reference to its availability within most modern home settings. Virtual world technology and video communication tools were identified as two software platforms facilitating collaborative, meaningful interactions between separately located people. Studies reported, however, text-based chat facilities embedded in virtual world software platforms restrict communicative exchange between users. Moreover, research suggests video communication tools inhibit children's ability to maintain a joint focus of attention and engage with each other during play situations. The section concluded by considering the combined use of these two software platforms as potentially facilitating gameplay between people in different physical locations.

2.3 Play and digitally-mediated environments

This section describes current understandings of children's play when virtual world technology and video communication tools are used separately in digitally-mediated environments. Specific reference is made to key elements of sociodramatic play observed and reported in various studies where children are using these software platforms. The synchronous use of virtual world technology and video communication tools is then considered as a platform to facilitate sociodramatic play for children in different physical locations through a digitally-mediated environment.

2.3.1 Play and virtual world technology

Traditional forms of children's sociodramatic play are dependent on children being in the same physical space. Networked digital technologies now present previously unavailable opportunities for children to engage in sociodramatic play situations through virtual world gameplay (Marsh, 2010). In a virtual world, children use digital tools to facilitate their avatar's actions whilst exploring in-world environments, often encountering and communicating with other avatars. By interacting with other users during in-world play, children can engage in shared sociodramatic play whilst experimenting with "adult social roles, vocabulary, and language forms associated with these real-world events" (Black & Reich, 2012, p. 29). Virtual world software platforms provide opportunities for children to purposefully re-enact real-world adult roles and real-life experiences through imaginative play in a virtual, socialised space where "new realms and possibilities emerge" (Burke, 2013, p. 59).

A study of the motivational factors of virtual world gameplay for 16 school age children (aged 6- to 11-years) indicated virtual world software platforms that offer activities based on real-world experiences were more popular with children as they promote enactment of recognisable behaviours (Sarachan, 2013). This aligns with the nature of traditional forms of sociodramatic play for school age children as their play episodes become more reflective of reality (Vygotsky, 2016). Although this study found social interaction was not a motivating factor for children to engage in virtual world gameplay, one participant indicated she was more likely to play longer if she knew a real-life friend was also playing in the same virtual world simultaneously.

Similarly, Marsh (2011) noted children who engaged in synchronous in-world play with siblings or real-world friends intentionally seek communicative opportunities more often than if they were playing alone. Moreover, the authors of a study of 8- and 9-year-old girls' use of Minecraft in their school classroom described the activity as a "highly social experience" (Dezuanni et al., 2015, p. 152) in which participants reported higher levels of enjoyment when playing together

compared to playing alone at home. These findings suggest engaging with known others in virtual world gameplay reflects two defining characteristics of sociodramatic play: social interaction and persistence.

For sociodramatic play to be successful, intersubjectivity, or a shared understanding of the play situation, must be established between play partners. According to Göncü (1993), intersubjectivity is achieved through three essential elements: maintaining a joint focus of attention, using meta-communication strategies (e.g., co-ordinating and manipulating imaginary play situations), and using symbolic language and behaviours. Several studies provide insight into how these essential elements are reflected in, and restricted by, virtual world gameplay.

2.3.1.1 Maintaining a joint focus of attention

During virtual world gameplay, users maintain a joint focus of attention when avatars collaborate on shared activities within in-world environments (Gillen & Merchant, 2012). Studies of children's use of virtual worlds suggest participants consider immersive online environments "a shared reality" (Merchant, 2009, p. 53), and when children play in the same virtual world with friends or siblings, "much of the interaction is focused" (Marsh, 2011, p. 112) compared to when they play alone. Several studies support the notion that children in a co-located physical space maintain a joint focus of attention when they engage in virtual world gameplay. In a school classroom, Burke (2013) found the embodied real and virtual identities children adopt during virtual world gameplay "move fluidly through the play narratives the children share" (p. 66). In a home setting, two siblings physically monitoring one another's screens jointly focused on in-world activities within the same online space (Danby, Evaldsson et al., 2018), and in an after-school club, children were observed sharing goals during in-world play (Wohlwend et al., 2011).

2.3.1.2 Using meta-communication strategies

Studies investigating how children in the same physical space engage in virtual world gameplay offer insight into the verbal and non-verbal meta-communication strategies they use

during play. Such strategies include giving verbal directions and pointing at the screen to co-ordinate an avatar's position and movements (Wohlwend et al., 2011), instructing each other, exchanging ideas, and participating in collaborative planning (Dezuanni et al., 2015), and using turn-taking communicative discourse and giving verbal instructions to co-ordinate actions to achieve shared set goals (Danby, Evaldsson et al., 2018).

For children in different physical locations engaging in virtual world gameplay, however, meta-communicative exchanges during sociodramatic play situations using text-based and/or voice-based chat facilities can be problematic. Firstly, text-based chat presents a myriad of communicative barriers for most young children. Vygotsky (1986) considered written language as the most complex form of speech "achieved only through words and their combinations" (p. 242) acknowledging when children use writing to express themselves, they often perform as though "significantly younger" (2004, p. 44) than they actually are. Most children under 8-years-old have limited expressive writing skills, so exchanging meta-communication strategies through text-based chat facilities may significantly restrict their ability to co-construct shared meanings during sociodramatic play. Secondly, voice-based chat prevents children from exchanging non-verbal meta-communicative strategies, such as facial expressions and gesturing, that often support verbal negotiations taking place during sociodramatic play situations (Monighan Nourot, 2006). In her study of children's use of virtual worlds, Marsh (2011) noted an inability to read other users' intentions through face-to-face interactions restricted meaningful exchanges during gameplay.

2.3.1.3 Using symbolic language and behaviours

Recent studies offer insight into children's use of symbolism during virtual world gameplay. Children have been found to use fluid symbolic language and behaviours to engage in experiences reflective of real-life situations, such as caring for a virtual pet, attending a virtual disco, and making virtual pizza (Burke, 2013). Interestingly, Sarachan (2013) found some child participants expressed a preference for nurturing virtual pets compared to replica toy versions.

Marsh (2011) reported various examples of how children use symbolic actions during virtual world gameplay. These included repeating actions of other avatars, using emoticons to communicate, clustering avatars together to form affinity groups, and joining in ritualistic activities (e.g., parties). She also found children attribute importance to their avatar's appearance which suggests symbolic representation of the embodied self is valued within virtual world gameplay, similar to when children select costumes during traditional forms of sociodramatic play. The graphical nature of the in-world environment, however, can restrict users' ability to effectively demonstrate symbolic behaviours as evidenced through one study's description of virtual world users positioning their avatars close to each other to convey aggression *and* to show affection (Reich et al., 2014).

2.3.2 Play and video communication tools

Several research studies provide insight into children's interactive play using video communication tools. In the aforementioned study of free play interactions between child dyads in adjacent laboratory rooms (Yarosh et al., 2010), many children were able to successfully play together, although trying to maintain a mental image of what their play partner could see was cognitively challenging and made successful play episodes increasingly difficult. The authors concurred that play is "a cognitively demanding activity that leaves few attention resources available for maintaining a mental model of what the other person sees" (p. 8). Subsequently, child participants had difficulty achieving intersubjectivity, particularly maintaining a joint focus of attention, thus inhibiting successful sociodramatic play. The study found face-to-face interactions were essential in maintaining social play, as they offered children the opportunity to determine where play partners were directing their attention. Moreover, children enjoyed seeing themselves on screen and the mobile nature of some devices enabled children to control their play partner's view, promoting turn-taking opportunities. This study highlights how separately located children might

maintain a joint focus of attention during virtual world gameplay by seeing what the other child sees: the same in-world environment.

In the study comparing children's telephone conversations with video communication conversations (Ballagas et al., 2009), findings reported voice-only conversations were socially challenging for children under 9-years-old as they are structured differently to face-to-face conversations and limit children's ability to pay attention. Video chat, however, was found to facilitate exchange of meaningful body language, gestures, and facial expressions during play-based conversations. This suggests video chat supports children's ability to transfer non-verbal meta-communication strategies that carry meaning in face-to-face interactions.

One of the key findings from the studies of children's use of video communication tools was that most child participants preferred video chat to text-based or voice-based chat as it was easier to use and/or more enjoyable (Austin et al., 2017; Ballagas et al., 2009; Giannakos et al., 2013). This indicates children in different home settings who use video chat during virtual world gameplay may be seeking to satisfy "certain needs in play" (Vygotsky, 1978, p. 93), by potentially fostering a more enjoyable, easier means of communication with a separately located play partner.

2.3.3 Play as a leading activity in digitally-mediated environments

Research suggests sociodramatic play is the predominant play type apparent in virtual world gameplay (Marsh, 2010). When children in separate locations engage in sociodramatic play in an online space by synchronously using virtual world technology and video communication tools, findings from several studies indicate they may successfully achieve intersubjectivity according to its three essential elements. First, children can maintain a joint focus of attention by engaging in shared activities within the same in-world virtual environment. Second, children can exchange verbal and non-verbal meta-communication strategies via video chat to control and manipulate in-world imaginary play situations. Third, children can use symbolic language via video chat and symbolic behaviours through embodied actions as avatars to enact in-world imaginary play

scenarios. Figure 2.1 represents how separately located children might achieve intersubjectivity during virtual world gameplay via video chat in a digitally-mediated environment in the home setting.

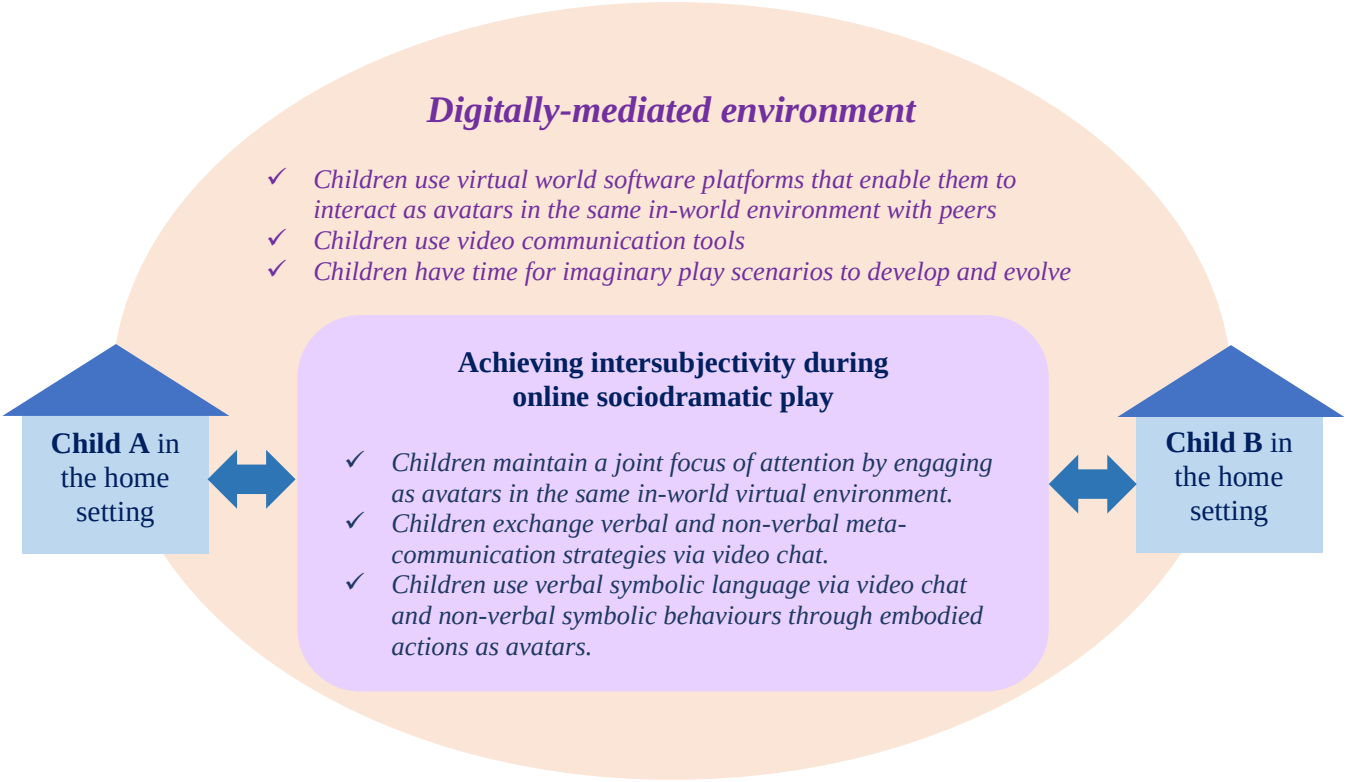

Figure 2.1. Achieving intersubjectivity during online sociodramatic play.

During sociodramatic play, children voluntarily and willingly create and enact imaginary role-based and rule-bound scenarios using symbolic actions, objects, and language (El'Konin, 2005a) leading to development of their central psychological functions (Vygotsky, 1978). Current understandings of what this form of play looks like for separately located children, however, is lacking. In sociodramatic play situations, children use their imagination to stretch beyond real-world experiences into landscapes of "new dimensions and possibilities" (Monighan Nourot, 2006, p. 92). According to Vygotsky (2004), children draw on their imagination when they interact with material aspects of their environmental surrounds (something to play with) to rework imaginary ideas (something to play about) in meaningful and personally significant ways (Edwards, 2011).

Similarly, in virtual world environments, players adopt roles (as avatars) and use graphically represented symbolic actions, objects, and language to play 'with' and 'about' imaginary ideas.

Lane and Yi (2017) suggest children's play in a virtual world, such as Minecraft, reflects the cultural-historical view of play in multiple fundamental ways as it "calls attention to four aspects of play: the child's needs, inclinations, incentives, and motives to act" (p. 163). In acknowledging Vygotsky's (2016) view that play is essentially the "imaginary, illusory realisation of unrealisable desires" (p. 7), the authors argue the social situation presented in Minecraft enables children to achieve desired goals and fantasies through shared purposes. Moreover, studies exploring children's use of virtual worlds suggest a variety of opportunities exist for children to draw on real-life experiences to inspire imaginative thought, for example, building a shower for an avatar (Dezuanni et al., 2015), creating a secret land for an avatar (Dezuanni, 2018), and making emotional connections to graphically represented 'pets' (Burke, 2013; Sarachan, 2013; Schamroth Abrams, 2016). Many parents also view Minecraft as providing creative and imaginative play opportunities for 3- to 12-year-old children (Mavoa et al., 2017). These studies support the notion that synchronously using virtual world technology and video communication tools potentially offers separately located children an opportunity to engage in a form of play that supports development of the psychological function of imagination.

Summary

In this section, sociodramatic play was identified as one of the predominant play types within virtual world gameplay. The limitations of children's ability to achieve intersubjectivity during sociodramatic play whilst using virtual world technology and video communication tools separately were identified and explained. The notion of using virtual world technology and video communication tools synchronously to facilitate children's ability to achieve intersubjectivity during sociodramatic play in a digitally-mediated environment was considered. Several studies reported on the capacity of virtual worlds to enable children to use their imagination during gameplay. A gap in the knowledge exists, however, into what this form of play looks like when

separately located children engage as avatars in the same virtual world environment whilst using video chat to facilitate their gameplay.

Conclusion

The research literature in this chapter described traditional forms of sociodramatic play as fostering significant cognitive developmental outcomes for preschool and early school age children. Digital technologies were recognised as facilitating contemporary forms of play for the current generation of children. The synchronous use of virtual world technology and video communication tools was considered as effectively scaffolding sociodramatic play opportunities for children in separate locations through a digitally-mediated environment. A review of several recent studies indicated a heightened need exists for parents to be better informed about how digital forms of play support children's cognitive development. Investigating how specific software platforms facilitate cognitively beneficial forms of play will address this need. In the next chapter, the theoretical framework informing this study will be explained to establish a firm foundational basis for the notion that engaging in online sociodramatic play fosters development of significant psychological constructs for separately located children.

Chapter 3 Theoretical Framework

Introduction

In this research, the nature of play as a leading activity (sociodramatic play) for separately located children using networked digital technologies is examined to inform parents about cognitively beneficial forms of play in online spaces. This chapter will provide a detailed explanation of the theoretical framework selected to address the research question in this study:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

Play as a leading activity is a cultural-historical theoretical concept and represents the unit of analysis in this inquiry. Drawing on this concept will illuminate insight into cognitive benefits reaped by children engaging in the play practice under investigation. In this chapter, the theory of leading activities and their role in human psychological development is explored and described from a cultural-historical perspective. The concept of *play as a leading activity* is defined and explained, with specific reference to how the psychological function of imagination provides a fundamental basis for this form of play. The connection between play as a leading activity and children's psychological development is examined and discussed. The chapter concludes by considering how play as a leading activity manifests in a contemporary context through children's use of networked digital technologies.

3.1 Cultural-historical theory

Cultural-historical theory originates from the work of Russian psychologist, L. S. Vygotsky, and his circle of scholars, who collectively viewed the social and cultural influences of a particular historical era as significantly affecting how humans are raised and taught (Davydov, 1995). In cultural-historical theory, social interactions within specific cultural settings at a particular point in time are viewed as influencing human psychological development in markedly different ways. Fundamentally, cultural-historical theory suggests there is an inextricable link between the naturally

occurring, biological evolution of cognitive development, and the socially interactive, culturally acquired process of cognitive development (Bodrova & Leong, 2015).

From a cultural-historical perspective, humans develop psychological functions according to changing social situations in particular cultural settings, such as homes and formal learning environments. These psychological functions are progressively acquired through external, collective, social interactions and collaborations with others, and later internalised by an individual. In cultural-historical theory, biologically acquired 'lower' mental functions are restructured into 'higher' mental functions according to social and cultural influences (Vygotsky, 1978). For example, infants rely on biologically determined lower mental functions to express hunger through crying. Later, through social interactions in cultural settings, children draw on higher mental functions to acquire language enabling them to express hunger through speech. Higher mental functions are considered intentional, purposeful human activities, exhibited through the use of internalised cultural signs, such as language, and gradually acquired over a lifetime (Bodrova & Leong, 2015).

3.2 Leading activities

According to cultural-historical theory, the process of building higher mental functions is essential in the development of a human's personality enabling an individual to be psychologically capable of effectively participating in social and cultural settings (Kravtsov & Kravtsova, 2010). The early childhood years (birth to 8-years-old), in particular, represent a period of significant accomplishments during which lower mental functions are restructured into higher mental functions. This process occurs through a series of leading activities which link to one another over a human lifespan to bridge one central psychological function to the next. Leading activities are essentially those activities that lead human psychological development by building new cognitive schema or re-organising existing schema in developmentally significant ways determined by social and cultural experiences (Duncan & Tarulli, 2003).

The cultural-historical theoretical concept of leading activities was initially proposed by Vygotsky (1978) who suggested the imaginary play of preschool children was the "leading activity that determines the child's development" (p. 103). Post-Vygotskian scholars have since extended the theory of leading activities to include other human activities that offer ideal conditions in fostering development of higher mental functions at particular stages of life. For example, the leading activity for infants is *relating emotionally* to adults and the leading activity for primary school age children is *learning activity* (El'Konin, 1999). By describing play as a leading activity, Vygotsky inspired a school of thought that revolutionised traditional and contemporary understandings of stages of children's psychological development.

Leading activities emerge and evolve according to the development of age-related psychological structures through verbal communication in a particular social activity, referred to as the *social situation of development* (Kravtsova, 2006). The changing conditions of a social situation of development is core to the theory of leading activities as these social situations correspond with a child's psychological stage of development at a particular age. Social situations of development are significant as they restructure the relationship between higher mental functions in a complex, unique way and give rise to central psychological functions children require for the next developmental stage.

When children experience a change in their social situation of development within a particular cultural setting through the way they relate to adults, their psychological processing adapts so they can successfully participate within this new social situation (Duncan & Tarulli, 2003). Subsequently, leading activities are not necessarily universally applied, rather, they vary according to the cultural practices of members of a society at a particular point in time. What is universal about leading activities, however, is the way they sequentially build on each other to contribute to an individual's ongoing psychological development over a lifetime.

Leading activities signify the combination of internally transformed motivational and psychological aspects of cognitive functioning at age-related developmental stages. Although leading activities vary in function, El'Konin (1999) suggests "they are all elements of human culture . . . they have a common origin and a common place in the life of society; they all represent the result of a product of history" (p. 26). For example, the way a baby relates to adults is significantly different to the way preschoolers relate to each other through play, however, relating to others satisfies certain motivational and psychological needs so these activities share common social and cultural elements.

While humans engage in various activities throughout their lifetime that also foster simultaneous development in other areas, leading activities are considered the most important activities that contribute to psychological advancement at a given developmental stage. Generally, leading activities are classified according to age-related developmental stages, however, Vygotsky (1998a) asserts chronological age is not always a reliable indicator of a child's developmental stage if cognitive or environmental deficits exist. Subsequently, the established link between chronological age and leading activities will vary according to atypical factors in an individual child's development, such as intellectual disability or social isolation.

When children can spontaneously and voluntarily recall the processes of a particular leading activity by verbalising their reflections to adults, they are considered to have mastered that leading activity (Kravtsova, 2006). Upon mastering a leading activity, children's social contexts are altered, meaning their relationships with adults change, creating a new social situation of development. Entering a new social situation of development gives rise to emerging psychological functions that support the evolution of the next leading activity. Mastery of a leading activity means the child has advanced sufficiently in psychological terms for the leading activity representative of their particular stage of development to recede into the background paving the way for the next leading activity to emerge (Leontyev, 2009). Interestingly, when a new leading activity emerges as the

predominant activity at a particular developmental stage, previous leading activities do not cease to exist, rather, they significantly enrich the way individuals experience their social relationships within cultural settings.

3.2.1 Leading activities and children's psychological development

The cultural-historical theoretical concept of leading activities has made a significant contribution to current understandings about how children play, learn, and develop through social situations in cultural settings (Edwards, 2011). Leontyev (2009) describes three characteristics of leading activities that contribute to children's psychological development. First, leading activities build new forms of psychological functions required for a particular stage of development. For example, play requires children to understand and follow others' instructions. These receptive language skills transfer to real-life social situations, such as being able to follow teachers' instructions in formal educational settings. Second, leading activities, and those activities associated with them, mould and/or restructure certain psychological processes according to a child's particular stage of development. For example, a toddler might acquire a conceptual knowledge of shape attributes through block manipulation. This activity builds cognitive schema required for imaginary play situations, such as using a flat rectangular block to symbolically represent flat rectangular objects like a mobile phone. Third, leading activities make the most significant changes to a child's personality at a particular stage of development. For example, role-playing a doctor or a shopkeeper during play builds a child's conceptual understandings of how adults behave and function socially in their cultural communities.

Leading activities in childhood are built on the development of new psychological formations stemming from a child's evolving ability to become conscious of their surrounds and demonstrate self-awareness. These formations emerge during lytic and critical developmental periods according to a child's chronological age (Kravtsova, 2006). Lytic developmental periods are relatively smooth and unremarkable over time, giving rise to new psychological formations, such as

the acquisition of speech and the maturation of voluntary attention. During critical developmental periods, however, a child experiences conflict within certain social situations. Vygotsky (1998a) refers to a critical developmental period as a *crisis*, where changes in the child's personality appear abruptly and unexpectedly. For example, a 3-year-old might start insisting on choosing her outfit for the day, or a 7-year-old might reject parent-initiated friendships, preferring to form his own friendships. Although negative behaviours are often symptomatic of a crisis at a particular age, these unexpected changes often lead to positive outcomes, such as the 3-year-old becoming more independent, or the 7-year-old establishing new friendships with peers based on similar interests.

New psychological formations developed during lytic periods of development, such as speech and voluntary attention, are retained throughout the child's lifetime, however, those that emerge during critical periods eventually subside. Importantly, the end of a critical period signifies a change in the child's self-awareness and consciousness, primarily as a result of the way they communicate with adults. This change prompts a stable period of development during which children's central psychological functions progressively evolve (Kravtsova, 2006). For example, the central psychological function *perception* develops after the crisis at age 3 as children reassess how they perceive their surroundings, and the central psychological function *emotions* develops after the crisis at age 7 as children become more capable of identifying and managing their own and others' affectivity.

As new central psychological functions emerge and develop, they enable children to effectively engage in everyday social interactions within the cultural settings in which they live. Importantly, this process of cognitive development prepares children to be psychologically capable of effectively participating in the leading activity for the next development stage. The stable period of development ends when children change the way they relate to and communicate with adults, and a new critical developmental period begins to form. In this research, the child participants were aged 7- to 8-years-old, so it was important to recognise that their behaviours during the social

situation of development under investigation may have reflected elements of a critical developmental period. For example, children may have experienced heightened internal conflicts affecting their ability to make clear decisions or demonstrated odd behaviours that were "somewhat fanciful, artificial, mannered, and forced" (Vygotsky, 1998b, p. 290).

In childhood, the nature of a child's psychological development at a certain age changes as the child gets older (Kravtsova, 2006). The social conditions of a particular leading activity replicate the conditions for a child's psychological development according to the relationship between the child's personality and the social environment in which they live. Different social situations of development give rise to different psychological formations that provide the foundational basis for the leading activity defining the nature of a child's development at a certain age. Importantly, leading activities do not represent the most common activity of a particular developmental stage, rather they represent the most significant activity for the development of children's central psychological functions (Duncan & Tarulli, 2003).

3.3 Play as a leading activity

In cultural-historical theory, play is the leading activity for preschool and early school age children (aged 3- to 7-years-old) as it is considered the most important activity that contributes to the development of central psychological functions of children in this age group (Vygotsky, 1978). In this research, play as a leading activity is represented by the term *sociodramatic play* which sees children willingly adopting roles and using symbolic actions, objects, and language in rule-bound imaginary situations (El'Konin, 2005a). During this form of play, children assign symbolic meanings to objects and actions, purposefully incorporating them into specific types of social situations representing fundamental human activities and interactions (El'Konin, 1999).

Sociodramatic play represents a social situation where children's internal actions and external actions are inextricably linked as "imagination, interpretation, and will are internal processes in external action" (Vygotsky, 2016, p. 16). Acting in imaginary situations requires

children to use a specific type of verbal communication to mutually maintain the make-believe nature of the play and represents a new social situation of development that underpins play as a leading activity. For play to be considered a leading activity, it must involve the creation of an imaginary situation through symbolic role-based actions, as opposed to games with overt rules like board games or sporting games. The concept of rules within imaginary play situations remains, but they differ from rules-based games.

In rules-based games, the rules are established at the beginning whereas in sociodramatic play situations, children adhere to particular behavioural rules according to the nature of the imaginary play scenario. For example, children playing 'mothers and fathers' will adhere to the rules of maternal and paternal behaviours such as feeding a doll with a bottle and changing its nappy. Adhering to rules of behaviour in imaginary play situations is important because "mastering the rule means mastering one's own behaviour, learning to control it, learning to subordinate it to a definitive purpose" (Leontyev, 2009, p. 350). If an imaginary situation did not exist in play, the rules would dictate the child's behaviour, as in rules-based games. Rules-based games are not entirely free of imaginary situations, however, as they exist in latent forms. For example, the board game Operation® requires players to adopt a doctor role to treat a patient.

A significant difference between sociodramatic play and rules-based games is that, for the latter, the rules are restrictive and regulated, eliminating the possibility for children to create their own imaginary situations. Moreover, a child's motive to engage in sociodramatic play is based on the process of the imaginary play situation itself, as opposed to the action resulting from the play (Leontyev, 2009). For example, a child's motive for role playing a 'doctor' is to perform doctor-related actions, whereas for a board game like Operation, a child's motive is to win the game. An important consideration for this research was to select a suitable virtual world software platform that enabled children to create their own imaginary situations. For example, virtual worlds such as

Roblox and Fortnite® offer predominantly rules-based games, whereas virtual worlds like Minecraft and The Sims®, provide opportunities for users to create imaginary situations.

Sociodramatic play is considered a leading activity as it enables children to draw on previous life experiences to creatively represent future endeavours. By engaging in sociodramatic play, children are motivated to act in ways that fulfil particular unrealised needs, desires, and emotional aspirations. In cultural-historical theory, children's social interactions within their cultural settings have the greatest influence on the nature of their play. For sociodramatic play, this is represented by the character roles children adopt and the interactions between these characters. This form of play provides a foundation for children to use symbolic objects and actions to actively recreate roles and rules of an organised society. For example, while playing 'shops', a child role-playing a customer might select plastic food items (objects), place them in a basket and 'buy' them (actions) from another child role-playing the shopkeeper. The use of symbolic objects and actions to recreate societal roles and rules is altered in a virtual world environment, however, as tangible objects are replaced with graphical images and physical actions are replaced by virtual actions of an avatar.

Leontyev (2009) suggests sociodramatic play situations arise not just from a child's desire to act within any environment using available objects, "but also to the wider world of adults" (p. 336). Children's desire to emulate adult behaviours to create imaginary play situations is supported by El'Konin (2005a) who reported a vignette of a preschool teacher's reflections after taking the same group of children on two separate trips to the zoo. During the first visit, the teacher described different animals to the children, focusing on factual information such as characteristics, eating habits, and habitats. Back at preschool, the teacher supplied the children with toy versions of these animals for play opportunities, however, the toys failed to inspire children's sociodramatic play. During the second trip, the teacher again described the animals, but also focused on the roles of zoo personnel (e.g., cashiers, cleaners, zookeepers). After the second trip, the teacher observed children

engaging in sociodramatic play situations, often lasting several days, created from zoo-based adult activities using toy animals. The children were also seen drawing on knowledge acquired from the first zoo trip to provide meaning and context to their imaginary play scenarios. For El'Konin (2005a), this vignette suggested children's sociodramatic play is based on two different aspects of their social and cultural realities, human activity and interactions, and the natural and/or artificial objects available.

Sociodramatic play frees children from the constraints of their surroundings as they can distinguish a visual, concrete field of meaning from an imaginary field of meaning. By separating meaning from objects and actions, children make specific decisions about a chosen course of action based on their motivations for the imaginary play situation. Vygotsky (2016) considered this movement from a concrete field of meaning to an abstract field of meaning as "the most important movement in play" (p. 17). Leontyev (2009) referred to this process as "play sense" (p. 340) which sees children developing a special sense for the operations they use with the objects of play. Play sense arises when children separate the sense of an object from its meaning as imaginary play situations unfold and develop through a dynamic and fluid process.

During sociodramatic play situations, children's perceptions and thoughts undergo radical changes. They attach new meaning to objects and adapt their behaviour according to perceived realities. For example, siblings playing 'beaches' inside their home on a cold winter's day may use wooden floorboards to represent sand, then tiptoe across the floorboards because the 'sand' is very hot. Enacting play sense in a virtual world can be constrained, however, if embedded storylines require graphical objects to be used for specific purposes. For example, in Webkinz World®, many virtual objects, such as food and clothes, are used to care for an adopted pet (Black & Reich, 2012). This type of game design significantly restricts children's ability to assign new meaning to objects as they are positioned by game designers to "successfully co-construct the story that the virtual world is telling" (Hafner, 2015).

Sociodramatic play is a qualitatively unique activity where children's social and cultural realities have a "decisive influence on the themes of the play" (El'Konin, 2005a, p. 40). This is an important aspect to consider when investigating children's sociodramatic play in a digitally-mediated environment as virtual world software platforms are restricted by thematic limitations set by adult creators of the game. Acknowledging how software gaming themes might support digital forms of children's play can often be disregarded when concerns are raised about digital technologies negatively impacting the quality of children's play (e.g., see Palmer, 2016). Stephen and Edwards (2018) suggest such concerns can be over-simplified and echo other moral panics throughout history when new forms of technology have been introduced into family homes (e.g., radio and television).

Singer and Singer (2005) argue the embedded themes offered in simulated, role-playing computer games can support imaginary forms of play in various ways, such as through constructing play narratives and adopting roles. Moreover, these authors recognise that computer software manufacturers work towards providing opportunities for children to engage in "imaginative and constructive play" (p. 135) through digital gaming experiences. Similarly, Lane and Yi (2017) highlight the importance of developing informed understandings about potential creative opportunities virtual world gaming platforms such as Minecraft provide rather than "making bold claims about their consequences" (p. 146).

Virtual worlds have been found to reflect themes that support sociodramatic play. For example, children were observed engaging in "activities based on domestic, everyday practices" (Marsh, 2010, p. 30) and experimenting with "early rehearsals and re-enactments of roles and experiences" (Burke, 2013, p. 59) whilst using the virtual world Club Penguin®. Moreover, Lane and Yi (2017) assert the construction-based themes in Minecraft allow players to manipulate tools and resources that place "no active restrictions on the player's imagination" (p. 151). Virtual worlds also provide opportunities for players to draw on themes from popular culture to inspire imaginary

play scenarios. For example, Minecraft enables players to adopt roles as characters from the popular Star Wars® franchise.

Like other leading activities, sociodramatic play does not represent the predominant activity of children's particular stage of development. Rather, a child's behaviour during sociodramatic play situations and real-life situations are fundamentally opposite. In sociodramatic play, meaning is prioritised over action, whereas in real life, action is prioritised over meaning. Moreover, children aged 3- to 7-years-old do not spend all their time engaging in sociodramatic play. They participate in a variety of other activities, such as rules-based games, that also foster important psychological constructs (Leontyev, 2009). For example, a game of hide and seek might foster development of self-awareness (when children compare their abilities with other players to select suitable hiding places) and moral judgement (when children make decisions about adhering to or flouting rules of the game). Sociodramatic play is considered a leading activity, however, while rules-based games are not. This is because leading activities are those that govern the *most* significant changes in the child's cognitive processing at a particular stage of development.

For 7- to 8-year-old children, sociodramatic play situations change significantly as the rules of play are more explicit and prioritised over the imaginary situation and the play becomes more reflective of real-life experiences and events (Bodrova & Leong, 2007). According to Vygotsky (1978), school age children are more capable than preschoolers of assigning meaning to their actions through self-awareness and self-perception and internalising play-related components independently. This means older children are better psychologically equipped to consciously recognise the symbolic meaning of actions and objects they use during imaginary play situations. Moreover, school age children use more concentrated verbal interactions and the roles they adopt are less readily observable than in the play of younger children (Kravtsov & Kravtsova, 2010). A consideration of these comparative factors is important in this research as investigating the

sociodramatic play of 7- to 8-year-old children in a digitally-mediated environment requires an informed understanding of the nature of older children's play.

3.3.1 Imagination as a basis for play as a leading activity

The creation of an imaginary situation is central to the concept of play as a leading activity. Fundamentally, sociodramatic play becomes the leading activity for 3- to 7-year-old children when they are capable of transforming imaginative thought into action. The essential foundational psychological function necessary for children to effectively create imaginary situations is *imagination* (Vygotsky, 2004). In early childhood, imagination arises from children's self-awareness and consciousness of social situations through connections they make between fantasy and reality within these environments. For imagination to appear in psychological development, Kravtsov and Kravtsova (2010) suggest children must be able to identify themselves as the subjects of their own speech and "control the space" (p. 30) between their perceptions. For example, a child is able to perceive a stationary toy car as racing along a race-track.

Children draw on imagination to inform sociodramatic play by creatively transforming previous life experiences into new realities based on needs and unrealised desires. Imagination is the new psychological formation arising from children's action in imaginary situations, the play action itself, as opposed to imagination determining the conditions of the play action (El'Konin, 2005b; Leontyev, 2009). Vygotsky (2004) theorised that new experiences and ideas are generated through two equally important types of human activities, *reproductive activities* and *combinatorial activities*. Reproductive activities draw on previous life experiences to help humans understand and relate to their environmental surrounds. For example, a child might paint a picture of a flower growing in the garden or use blocks to build a house similar to her own.

Combinatorial (or creative) activities, however, combine and rework elements of real-life experiences to generate new conceptual understandings or tangible objects through imaginative thought. While reproductive activities are important for children to better understand how they

relate to the world around them, combinatorial activities enable children to react and adapt to unexpected changes in their lives by generating new thoughts and behaviours in response to these altered conditions. Essentially, reproductive activities derive from past experiences, whereas combinatorial activities are future-oriented.

During sociodramatic play, children draw on reproductive activities, such as using a doll to represent a baby, however, it is the combinatorial activities that enable children to create and enact sociodramatic play scenarios. In cultural-historical theory, combinatorial activities are not based on unrealistic fantasy worlds, rather, they are firmly rooted in reality and reflect how children make meaning of the world around them. A child's imagination is primarily inspired through internal motivations, significantly shaping his or her psychological functioning. Children's ability to draw on combinatorial activities is an evolving, complex process of psychological development, usually beginning at around 3-years-old. Combinatorial activities enable children to creatively reimagine objects and actions of their social and cultural realities through imaginative representations.

According to Vygotsky (2004), the relationship between combinatorial activities (imagination) and reality underpins the concept of play as a leading activity in four predominant ways. First, imagination connects to reality, so children's real-life experiences inspire imaginative thought. A broad range of life experiences exposes children to a wide variety of sensory stimulants (e.g., visual, auditory, olfactory) offering them increased opportunities to learn about and understand the world around them. Consequently, broader real-life experiences lead to a richer imagination as the child's neurological processes rework these life experiences in new and creative ways. Imaginary play situations, therefore, are established and developed according to children's previous life experiences in concentrated form. For example, a family fishing trip inspires two brothers to imagine a patch of grass in their backyard is the 'ocean'.

Second, products of children's imagination connect to reality in meaningful ways, leading to increased understandings of real-life concepts. Products of a child's imagination represent reworked

concepts derived from previous real-life experiences. These concepts enable children to assign meaning to real-life phenomena to inform their imaginary play scenarios. This is only made possible, however, through the child acquiring an understanding of real-life concepts from others. These 'others' might be family members, movie characters, or book authors. So, children who have experienced a family fishing trip might put objects (such as leaves) on the grass to represent 'fish'. This demonstrates a conceptual understanding that fish live in the ocean, acquired through the adults who enabled the fishing trip experience. Consequently, the first two ways imagination relates to reality are inextricably linked. In the first instance, imagination derives from real-life experiences, whereas in the second, real-life experiences derive from imagination.

The third way combinatorial activities and reality interrelate involves the link between imagination and affectivity. This means children make emotional connections to products of their imagination. In order to do this, children need to understand how internal feelings (e.g., happiness, anger) relate to the external expressions associated with those feelings (e.g., smiling, frowning). So, feelings children experience through imaginary play situations elicit similar external expressions as non-play activities. For example, the brothers attach string to sticks to go fishing in their 'ocean' and smile and/or laugh when they catch a 'fish' demonstrating a genuine feeling of happiness.

Fourth, products of imaginative thought manifest differently in real, tangible ways. During sociodramatic play, children might draw on their imagination to construct material items to satisfy unrealised desires within the imaginary play situation. For children, these tangible products are as real to them as the actual objects themselves and are utilized to extend and enhance sociodramatic play situations, significantly altering the course of a play episode. For example, the brothers use boxes to create boats to go fishing in their 'ocean'. Imaginary constructs, therefore, arise directly from internal realities, such as feelings, thoughts, and conceptual understandings. For the brothers sitting in boxes on a patch of grass holding sticks with a string attached, the experience mirrors their real-life family fishing trip through action in an imaginary situation.

These four combinatorial activities are cyclical during children's creation of imaginary play situations and, although internally-driven, are wholly dependent on their social and cultural environments. Combinatorial activities support play as a leading activity as children meaningfully use and interact with material objects available within their physical surrounds (e.g., leaves, sticks, boxes) to rework imaginary ideas (e.g., going fishing) drawn from real-life personal experiences (Edwards, 2011). In virtual world environments, however, play objects are immaterial, so, as in the real world, children draw on the resources available to rework imaginary ideas in personally significant ways by using and interacting with graphically represented figures and objects.

According to Gillen and Merchant (2012), virtual world environments represent simulated versions of material, familiar worlds, where manipulation of immaterial resources enable users to experience authentic, lifelike activities. They argue this occurs through physical interactions that facilitate virtual world gameplay via a tablet screen (e.g., swiping, tapping, dragging) or peripheral device (e.g., using a mouse, keyboard, game controller) allowing players "to see, to inhabit, and often to modify that world and in doing so they become material" (p. 11). This suggests children experience a physical connection with immaterial play resources through the devices they use by manipulating and controlling these resources in similar ways to material play resources (e.g., leaves, sticks, and boxes).

3.3.2 Play as a leading activity and children's psychological development

From a cultural-historical perspective, engaging in sociodramatic play in childhood is transformative as it contributes to the development of children's higher mental processes. El'Konin (2005b) describes four cognitively beneficial outcomes resulting from children's engagement in sociodramatic play. First, sociodramatic play leads to development of *intentional behaviours*. Intentional behaviours during sociodramatic play are deliberate acts where children self-regulate their actions and interactions according to the role-based and rule-bound nature of imaginary play situations, acting deliberately to achieve long term goals. Intentional behaviours require children to

manage and control their behaviour to overcome reactive, impulsive responses in order to successfully participate with others during imaginary play situations. For example, children wanting to play 'shops' will delay play to set up their shops. Second, sociodramatic play leads to the development of reflective thinking. During sociodramatic play situations, the relationship between what is *real* and what is *imaginary* provides powerful motivation for children to view aspects of play from multiple perspectives. For example, children playing shops might prompt each other to behave in ways reflective of shopkeepers and customers and use symbolic objects representing agreed-on real-life items, such as using a box as a cash register.

The third cognitively beneficial outcome of sociodramatic play is development of abstract thought. During imaginary play situations, children transform concrete thinking (e.g., a stick can only be a stick) to abstract thinking by assigning new meanings to objects (e.g., a stick can be a horse). This process, known as *substitution*, has certain boundaries. For substitution to occur, material properties of an object should suitably represent the imagined object for the child to assign it new symbolic meaning. Objects children select in sociodramatic play situations "fulfil different functions . . . and participate differently in the structure of the game" (Leontyev, 2009, p. 342). For example, a child role-playing a shopkeeper might use a cereal box as a cash register whereas a stick or a ball would be unsuitable.

Similarly, during sociodramatic play situations, children assign new meaning to their actions as they cannot separate internal actions related to the imaginary scenario (such as imaginative and interpretive thought processes) and their external actions. For example, a child role-playing a shopkeeper might tap on the cereal box (cash register) to calculate the cost of purchased items. By assigning new meanings to objects and actions, play becomes a "generalised activity" (Leontyev, 2009, p. 341) as children can act in imaginary situations using generalised operations with objects in a broad range of conditions. For example, a child tapping on a cereal box could represent different character roles, such as a shopkeeper using a cash register, a banker working on a

computer, or a pilot using a control panel to fly an aeroplane. Vygotsky (2004) theorised this process of dissociation represents "the foundation of abstract thinking, the basis of concept formation" (p. 26).

The fourth cognitively beneficial outcome for children engaging in sociodramatic play is that it leads to development of more sophisticated intentional behaviours, such as the ability to plan and monitor mental processes. This occurs when children communicate with each other using play-related language and exhibit behaviours adhering to rules dictated by imaginary situations. Importantly, play-related language children use during sociodramatic play situations scaffolds a "mutual regulation" (Karpov, 2005) of behaviours among play partners, subsequently heightening children's ability to demonstrate sophisticated intentional behaviours by meeting the expectations of their peers in play.

Fundamentally, sociodramatic play is significant in the development of higher mental processes in childhood as the nature of the social situation requires children to create imaginary play scenarios reflective of adult behaviours and interactions through generalised role-play, substituted objects, and intentional behaviours (El'Konin, 1999). Sociodramatic play serves as the catalyst for connecting two central psychological functions in children; *emotions* and *memory*, facilitating participation in their social and cultural worlds. This represents a crucial transition in child cognitive development because, during the preschool and early school age period, memory enters a "period of maximal development" (Vygotsky, 2019, p. 87) and begins to occupy a progressively dominant position in children's mental processing, completely restructuring the psychological systems to which it was previously subordinated (e.g., perception, emotions). Subsequently, an underlying truth of this research asserts children who regularly participate in sociodramatic play situations have increased opportunities to develop the central psychological function of memory.

By engaging in this unique form of play, children learn to associate generalised operations and emotions into broader categories relating to real-life situations and people, such as a child pretending to cry whilst role-playing a baby, considered a significant accomplishment for children (Bodrova & Leong, 2015). Interestingly, Leontyev (2009) argues when children role-play non-human characters, such as animals or robots, they adopt human characteristics to perform the actions of the role. Although the subject exhibiting the actions has changed (e.g., from human to non-human), the actions themselves remain representative of human activities and interactions. For example, a child role-playing a cat will display human emotions or behaviours, such as smiling or speaking, rather than authentic cat behaviours. Thus, in imaginary play situations, children will enact roles that provide humanlike social functionality, even if they adopt non-human character roles. This is an important consideration in this research as many virtual world gaming platforms for children offer non-human avatar roles, such as animals in Animal Jam® or monsters in Minecraft.

Vygotsky (2004) considered the development and use of the psychological function of imagination as not only significantly impacting a child's capacity for education, but also possessing "a general significance that is reflected in all the child's behaviour" (p. 42). By requiring children to draw on external and internal actions concurrently, imagination leads to the development of higher mental functions, significantly influencing a child's potential for future learning. Children's ability to draw on imaginative thought equips them with psychological constructs required for core school subjects such as writing, drama, and art. Moreover, development of abstract thought is paramount for children to be psychologically equipped to acquire essential literacy and numeracy concepts, such as learning to read and solving mathematical problems.

Karpov (2005) argues development of "symbolic thought is not just important, but literally a must for children's successful learning at school" (p. 168) as children acquire complex theoretical knowledge (such as scientific rules, concepts, and laws) during school-based instruction. Throughout history, the way humans have used their imagination has significantly impacted the

social and cultural lives of people in local and global contexts. Vygotsky (2004) argued a productive imagination is “not just an idle mental amusement, not merely an activity without consequences in reality, but rather a function essential to life” (p. 13) as it significantly impacts a child’s future learning potential.

3.3.3 Play as a leading activity and the zone of proximal development

A key concept of cultural-historical theory is the *zone of proximal development* (ZPD). Vygotsky (1978, 2016) described the ZPD as a scaffold bridging the things children are capable of doing or understanding by themselves to what they are capable of doing or understanding through imaginary play situations or by collaborating with more knowledgeable adults and/or peers. Sociodramatic play awakens the ZPD in children through both of these processes. In the first process, the imaginary play situation itself creates a ZPD for children as, during sociodramatic play, children behave in ways beyond their chronological age and usual level of behaviour as though they are “a head taller” (Vygotsky, 1978, p. 102) than themselves. During imaginary play situations, children voluntarily and willingly adapt their behaviour to meet the demands of the play scenario, suppressing reactive and impulsive behaviour they might otherwise display in real-life situations. For example, a child might resist sharing her toys with her brother, but will happily do so while role-playing his ‘mother’ during an imaginary play situation. Moreover, the process of adopting roles in imaginary play situations with others has a meaningful impact on the development of a child’s personality (Kravtsov & Kravtsova, 2010). For example, a timid child might acquire assertive behaviours by role-playing a courageous character through imaginary play.

Imaginary play situations motivate children to control their behaviour in order to adhere to the rules of play because the play situation is more pleasurable and appealing to a child than succumbing to reactive impulses. A further crucial factor motivating children to self-regulate their behaviours during sociodramatic play is by meeting expectations of play partners to adhere to the ‘rules’ of imaginary play situations (Karpov, 2005). For example, when children role-play

'schools', the child role-playing the teacher will be expected by the other children to 'act' like a teacher, not a student. This type of play enables children to exhibit self-control, willpower, and intentionality, thus awakening a ZPD for children by advancing their level of behaviour beyond the level of their usual real-life behaviour. Monighan Nourot (2006) acknowledges sociodramatic play is powerful force in awakening the ZPD in children as "the sense of ecstasy and magic that pervades the mutual exploration of the boundaries of possibility is a powerful motivator to move beyond one's own view to encompass the perspectives of others" (p. 93).

In the second process, collaborating with more knowledgeable adults and/or peers, the ZPD is created for children during sociodramatic play when they share their knowledge with play partners (peers) about how imaginary play scenarios should proceed. Here, children assist each other to initiate, establish, and maintain the imaginary nature of the play situation by collectively acting as more knowledgeable 'others', even if there is little variation in the knowledge levels of individual children (Bodrova & Leong, 2015). The rule-bound nature of imaginary play situations is guided according to previous life experiences of individual children in a concentrated form as they co-construct different play scenarios.

3.3.4 Mastering play as a leading activity

Mastering play as a leading activity means children can voluntarily and independently reflect on their internal and external actions within imaginary play situations by describing them in a social context (Kravtsova, 2006). The ability to verbally reflect on imaginary play situations indicates children have become cognizant of their motivations for play prompting a shift in their consciousness and subsequently changing the way they relate to adults (Edwards, 2011). For example, two sisters aged 3-years-old and 5-years-old use a trampoline as a 'vehicle' to transport them to undiscovered planets. Later, the older sister remarks to her mother that the trampoline was a good choice for a space vehicle because when she jumped on it, she felt like she was really travelling through space. Here, the older sister demonstrates that she can voluntarily reflect on the

process of the imaginary play situation and her role within the play scenario by verbalising her experience to an adult. This change represents a shift in the way the older child engages with adults, meaning she enters a new social situation of development and advances towards a mastery of play.

When children master play as a leading activity, they demonstrate an ability to use self-awareness and self-perception by assigning meaning to their actions creating a new social situation of development known as *collective theorising.* Being capable of focusing on a common activity by collectively theorising with others gives rise to a new mental function, *attention*, which prepares a child to be psychologically capable of forming new cognitive schema required to adapt to the newly evolving social situation of development represented by next leading activity, *learning activity* (Kravtsova, 2006). From a cultural-historical perspective, learning activity is the leading activity for school age children where children's cognitive functions are built through instruction, presenting quite a different social situation of development compared to other leading activities from the preschool years. Learning activity is an adult-modelled process intrinsically motivating children to acquire new knowledge (El'Konin, 1999). Participating in learning activity is important for children as it requires them to pay attention on common social activities within cultural settings together, bridging the central psychological functions of *memory* and *thinking*.

Kravtsova (2006) suggests play as a leading activity extends beyond preschool age and permeates learning activity for school age children. This suggestion is particularly relevant to this research as the child participants in this study were aged 7- to 8-years-old. Play-related communication, however, such as the shared understanding of 'this is play' between play partners, differs from instruction-based communication representative of learning activity. Although most children are capable of learning activity in the early school years, the self-reflective aspect requires a supported scaffolding through social engagement with others, often peers. Play as a leading activity promotes mastery of the developmental accomplishments required to prepare children for future learning. For example, children who develop abstract thought through imaginary play

situations become psychologically equipped to understand abstract scientific concepts required for learning, such as recognising phonemes and graphemes in words. Moreover, sociodramatic play presents a unique context for children to willingly communicate with others "forming a cohesiveness that helps to provide 'psychological readiness' for learning in school" (Kravtsov & Kravtsova, 2010, p. 32).

3.3.5 Play as a leading activity in the digital age

Throughout history, cultural tools and products resulting from human endeavours, ideas, and activities transfer from one generation to the next. The process of actively recreating or reconstructing cultural tools, products, or ideologies from previous generations is known in cultural-historical theory as *appropriation* (Leontyev, 2009). For example, modern retellings of traditional fairy tales might alter the role of a helpless female character to a heroine to reflect contemporary views of a woman's role in society. How children living in a particular historical era appropriate cultural tools, products, and ideas significantly shapes and affects their psychological development. From a cultural-historical perspective, all human activity is mediated through cultural products (e.g., digital technologies) and/or tools (e.g., virtual world software platforms) available to them. Virtual worlds have been recognised as contemporary forms of cultural tools that mediate human activity and interactivity through immaterial spaces and objects (Nardi, 2010), facilitate discursive actions of users (Hafner, 2015), and influence children's learning and thinking (Jones & Park, 2015).

Play as a leading activity sees children actively appropriating social practices in cultural settings using the psychological function of imagination. Fundamentally, from a cultural-historical perspective, "it is the social context that provides the raw materials that children use in play" (Duncan & Tarulli, 2003, p. 286). Understanding how children use their imagination to generate new ideas and objects represents the knowledge and conceptual understandings being acquired through their everyday life experiences. Several scholars drawing on Vygotsky's theory of play

suggest the current generation of children is actively reworking and recreating traditional forms of sociodramatic play in digitally-mediated environments by appropriating software platforms, such as virtual world gameplay, through the networked digital technologies available to them (Black & Reich, 2012; Lane & Yi, 2017; Merchant et al., 2012). For example, Black and Reich (2012) argue children recreate social behaviours and language that emulate adult roles in society during virtual world gameplay and Lane and Yi (2017) suggest children use virtual worlds, such as Minecraft, to fulfil certain goals and fantasies through socially interactive play experiences. Similarly, Merchant et al. (2012) assert interactive virtual world environments offer children the opportunity to engage in imaginative and creative explorations with others. Moreover, by considering virtual world gameplay via video chat as a networked third space (see Ch. 2, p. 26–27), children's ZPD is potentially awakened in a metaphorical arena. This is because Gutiérrez (2008) draws on cultural-historical understandings of the ZPD to conceptualise third spaces as they mediate transformative learning through collaborative, participatory social activities.

In this research, separately located children engaged in action in imaginary situations using graphically represented figures and objects in the same virtual world environment via video chat. Participating in this social situation of development enabled children to draw on real-life experiences to create imaginary situations reflective of adult roles in society within a three-dimensional, graphically enhanced virtual world. This suggests the synchronous use of virtual world technology and video communication tools supports combinatorial activities for children in a digitally-mediated environment, fostering development of the central psychological function of memory. Mastery of this activity creates the foundational social situation of development, collective theorising, giving rise to the next leading activity of childhood, learning activity. This process is represented in Figure 3.1.

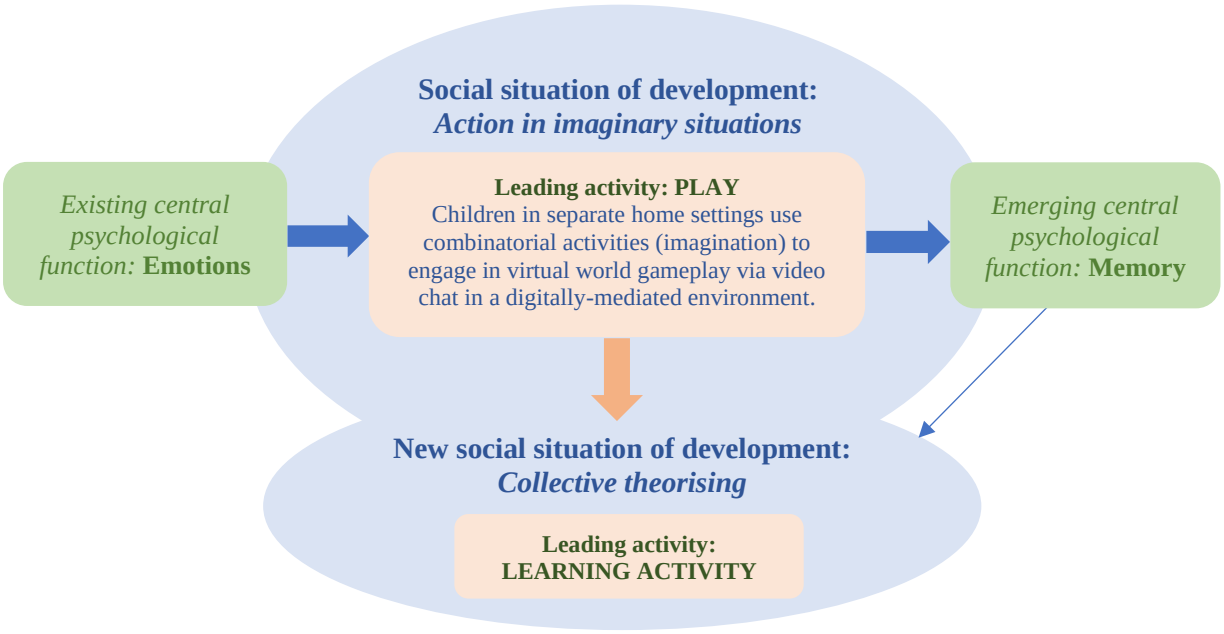

Figure 3.1. Mastering play as a leading activity in a digitally-mediated environment.

The creation of imaginary situations underpins the concept of play as a leading activity. Consequently, this investigation addressed the research question by examining how children in separate home settings used combinatorial activities to create imaginary situations in a digitally-mediated environment during virtual world gameplay via video chat. Collected data focused on four different ways children used combinatorial activities, as described by Vygotsky (2004), to explain fundamental characteristics of the unit of analysis: play as a leading activity.

Conclusion

This chapter explained the theory of leading activities from a cultural-historical perspective. Leading activities were described as being grounded in social situations of development that give rise to new mental formations and bridge one central psychological function to the next, enabling humans to successfully participate within cultural settings. Play, where children adopt roles and use symbolic actions, objects, and language in rule-bound imaginary situations, was acknowledged as the leading activity of preschool and early school age children. The psychological function of imagination was identified as the principal mental process required to give rise to this form of play.

The synchronous use of virtual world technology and video communication tools was considered a viable means for separately located children to engage in play as a leading activity in a contemporary context. The theoretical framework informing this study provides a foundational basis for addressing the research problem by conceptualising specific cognitive benefits reaped by children engaging in the play practice under investigation. In the next chapter, the methodology of this research will be explained to describe the systematic process employed to gain insight into the unit of analysis: play as a leading activity.

Chapter 4 Methodology

Introduction

This research investigated online sociodramatic play to provide new knowledge about how specific software platforms can be used to support children's cognitive developmental outcomes. This chapter will detail the methodological process used to address the research question in this inquiry:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

First, the philosophical assumptions of a qualitative research design framed by an interpretivist paradigm are explained. Interpretivism and its alignment to the cultural-historical approach to research informing the methodology of this study is clarified and the research design scaffolding this investigation is identified. Second, a description of the qualitative methods employed in this research, including data collection and analysis procedures, is provided. Third, important ethical issues and factors contributing to the rigour, risks, and limitations of this study are considered.

4.1 Qualitative research designs

Research involving human interactivity in different cultural settings is a branch of social science concerned with deepening understanding of everyday practices in people's lives and often conducted using a qualitative research design (Merriam, 2009). Qualitative research designs involve the exploration of certain variables within central social phenomena, where activities or processes involving particular types of human interactions are investigated (Creswell, 2014). Qualitative researchers seek to discover how a social phenomenon is experienced by individuals within a specific cultural world by adopting "interpretive, material practices that make the world visible" (Denzin & Lincoln, 2018, p. 10). These practices include qualitative, interconnected data collection methods, such as observations and interviews, to gain deeper insight into the lived experiences of different groups of people.

In qualitative research designs, researchers assume responsibility for collecting the principal data and interpreting the behaviours, interactions, and perspectives of participants within a unique social context (Hatch, 2002). To facilitate this process, qualitative researchers draw on their philosophical assumptions to make decisions about how their studies will be conducted and interpreted. Philosophical assumptions represent a researcher's set of beliefs, or world view, formed according to how they experience and interpret the world around them (Kivunja & Kuyini, 2017).

4.1.1 Philosophical assumptions of qualitative research designs

Qualitative researchers draw on their philosophical assumptions to scaffold an interpretive framework through a research paradigm. According to Creswell and Poth (2018), research paradigms reflect four key philosophical assumptions of an investigator; the nature of reality (ontology), the nature of knowledge acquisition (epistemology), the embedded values within a study (axiology), and the process of a study (methodology).

Ontology conceptualises the nature and characteristics of reality. Specifying an ontological standpoint in a research study is important because the way investigators view how reality is formed will shape how gathered data is interpreted. Epistemology considers what constitutes knowledge within the world and how this knowledge is acquired, communicated to others, and justified. Clarifying the epistemology of a research study is important because it requires researchers to deepen their understanding of the field in which their research is being undertaken so their investigations make a valuable contribution to that particular field.

Axiology in a research paradigm reflects how investigators view previously formed values and beliefs different people bring to a research setting. Adopting an axiological standpoint is important because values and beliefs influence ethical considerations of qualitative inquiries, such as how researchers might respond to different perspectives to their own during interviews. The methodology of qualitative research designs details the specific procedures researchers employ, such as how participants will be selected, and how data will be collected and analysed. Identifying

the methodology of a study is important because it guides the logic behind how a research question will be answered.

In considering these four philosophical assumptions, this research was underpinned by an interpretivist paradigm (Willis, 2007). Interpretivism reflects my personal world view as shaped by previous and current life experiences as a primary school teacher and parent. These roles have contributed to my belief that different people have different perspectives depending on their social experiences within specific cultural contexts. Acquiring knowledge is therefore is an evolving, dynamic process based on shared understandings of different people in a social group resulting in the creation of personal realities unique to an individual.

4.1.2 Interpretivism

Research seeking to understand the complexities of social worlds from the point of view of those who experience them is philosophically informed by *interpretivism* (Chowdhury, 2014; Schwandt, 1998). Interpretivism draws on pre-existing theories and a researcher's world view to shape and influence an inquiry (Willis, 2007). Although interpretivism is often linked to constructivism (Creswell & Poth, 2018; Denzin & Lincoln, 2018), there are key philosophical differences (Schwandt, 1998). While constructivists seek to understand social phenomena through subjective, interactive co-constructions from which theory emerges (Kivunja & Kuyini, 2017), interpretivists seek understanding of a research context by deconstructing aspects of social phenomena according to pre-existing theoretical concepts (Willis, 2007).

Interpretivists prioritise the importance of the research context in their investigations. Subsequently, they are actively involved in a research setting and highly responsive to changing conditions of social interactivity in specific cultural contexts. Researchers guided by interpretivist philosophical assumptions view their findings as contributing to a deeper understanding of a phenomenon to inform reflective practice, as opposed to describing a technical process (Willis, 2007). Findings arising from interpretivist-driven research aim to provide rich, detailed descriptions

of what is occurring in a research setting to reflect meaningful insight into specific human social activities.

The ontological stance in this investigation assumed a relativist viewpoint by acknowledging the existence of multiple realities (Merriam, 2009). Relativists believe reality exists in multiple forms in a research setting, and these realities can be explored and understood through interactions among the participants themselves, and between researchers and their participants (Kivunja & Kuyini, 2017). Interpretivists adhere to relativism as they assume that, in the social world, there is not one fixed reality to be discovered as different people have "multiple perspectives of reality" (Chowdhury, 2014, p. 433) which are internalised through social interactions in cultural settings. For interpretivists, truth is always relative to those involved in producing and consuming a research study (Willis, 2007).

This research involved the use of virtual world technology, so drawing on ontological relativism was philosophically viable. According to Merchant (2009), educational uses of virtual world technology by children draw on "a number of layered and interrelated social realities" (p. 42). These realities are perceived by the children themselves, their avatars, and the game's human designers, who also bring prior life experiences and values to a research setting involving the use of virtual worlds. Moreover, Burnett and Merchant (2014) suggest drawing on ontological realism to inform studies into children's use of virtual worlds is potentially limiting. They argue virtual world gameplay is multivalent, where different perspectives into insightful nuances of real and virtual embodied experiences often diverge rather than converge.

In accordance with a relativist ontology, an epistemological assumption of interpretivism is that researchers should interpret how individuals make meaning from their everyday experiences within specific cultural contexts to better understand social phenomena (Kivunja & Kuyini, 2017). Interpretivists prioritise the importance of the context in which research takes place and believe that acquiring knowledge is a social or group process (Willis, 2007). This aligns with a cultural-

historical perspective as Vygotsky (1978) suggests “all the higher functions originate as actual relationships between individuals” (p. 57). Subsequently, for interpretivist-driven inquiries, a subjectivist epistemology is presupposed, so investigators can view a research context through the eyes of their participants. For interpretivists, social interactions between individuals in a research setting is paramount to the interpretation of data and specific data methods are selected to best facilitate this process.

Researchers and their participants bring different perspectives, prior life experiences, and culturally acquired social knowledge to a research setting and these are equally valued and honoured through an interpretivist’s axiological lens. For interpretivists, an individual’s values and beliefs are embedded in a research context and these are acknowledged through a range of research techniques (Willis, 2007). Interpretivist research values inclusivity, where views are sought from people representing different groups in a research setting (Schwandt, 1998). These views are represented through two equally important, though contrasting, perspectives; the emic perspective and the etic perspective.

Emic perspectives reflect the views of the participants as informed by their conceptual understandings and social knowledge of the activity under investigation (Willis, 2007). Etic perspectives reflect the views of researchers (Merriam, 2009) and are based on previous life experiences and theoretical concepts informing the study, such as meaningful scientific terms and categories. In this research, emic perspectives were sought from the child participants and their parents. The etic perspective was represented by my own views, as the researcher, and informed in two different ways. Firstly, from my personal experience as a parent whose own children engage in the play practice under investigation. Secondly, from my professional experience as a higher degree research student who has acquired an informed theoretical knowledge of the cultural-historical concept of play as a leading activity.

Research underpinned by interpretivism draws on pre-existing theories to understand how different people make meaning from a social activity by regarding a specific research context as contributing to a unique "situatedness of knowledge" (Willis, 2007, p. 5). This means interpretivist researchers adopt research approaches that help them better understand social activities of specific cultural groups they are investigating. In accordance with this philosophy, the methodology of this inquiry was guided by the cultural-historical approach to childhood research (Hedegaard & Fleer, 2008). In adopting this research approach, a direct link was made between theory and methodology, and qualitative, interpretive methods were used to understand children's social practices in everyday cultural settings (homes) from multiple perspectives.

Interpretivists conceptualise the research process as a socially interactive activity, believing there is an inextricable link between the researcher and participants in a research context. This aligns with the cultural-historical approach to research, which sees researchers positioning themselves as partners in the activities of their participants in a research setting.

4.1.3 Researcher position

Researchers adopting a cultural-historical approach are positioned in a research setting as both an analyst and a participant (Hedegaard, 2008b). This means they conceptualise their own motivations, intentions, and projects about the activities under investigation whilst simultaneously conceptualising the participants' motivations, intentions, and projects within the activities. The aim is for the researcher to experience the activities with their participants so deeper insight is gained into the types of interactions occurring in the research setting. This participation can range from directly participating in the children's activities to remaining an observer.

As the researcher, my position adhered to the cultural-historical approach to research by experiencing the activities in the research setting with the child participants. This process enabled deeper insight to be gained into the unit of analysis: play as a leading activity. My participation ranged from quietly recording observations to asking child participants questions about their in-

world play activities (e.g., Where is your avatar going now?). The goals of the research were discussed and clarified with the child participants and their parents during an informal meeting in a public space and initial familiarisation home visits. During observational home visits, I was cognizant that my presence, and the presence of the video recording device, may have disrupted children's interactive play. These factors did not appear to be problematic, however, as children remained focused on in-world gameplay. While they occasionally included me in their activities (e.g., showing me something they discovered in an in-world environment), the video recording device was largely ignored.

In the cultural-historical approach to childhood research, researchers seek meaning of children's social practices within specific *institutions* from their own perspectives and from the participants' perspectives. Institutions are defined as everyday culturally-based settings (e.g., schools, homes, playgroups) where children meaningfully interact with adults and/or other children (Fleer, 2008a). Researchers must enter institutional-based research settings with clear understandings of the aims and theoretical concepts informing their studies both as visiting guests and as professionals undertaking research (Hedegaard, 2008c). Subsequently, researchers adopting this approach should clarify goals of their investigations to child participants through iterative, age-appropriate, oral explanations, and describe research aims and theoretical concepts informing their studies to adults within the setting.

The primary aim of positioning researchers as participants in the cultural-historical approach to research is for insight to be gained into factors contributing to the ethical implications, reliability, and validity of the investigation. Researchers must remain cognizant that their presence might influence activities under observation and this should be reflected when interpreting data and reporting findings.

4.1.4 Qualitative case study designs

Creswell and Poth (2018) suggest qualitative researchers select research designs for their investigations that best address the research problem. A research problem necessitating an in-depth understanding of a contemporary, unique, social phenomenon, where variables of the phenomenon cannot be separated from the real-life context in which it occurs, is best addressed through a case study design (Yin, 2014).

Case study designs are often used by interpretivist researchers employing qualitative methods exclusively as a comprehensive understanding of the research context is able to be reported in a richly detailed manner (Willis, 2007). In this investigation, a qualitative case study design was employed to address the research problem, which was to gain insight into how networked digital technologies facilitate contemporary forms of play for separately located children, and answer the research question:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

In qualitative case study designs, the *case* is a bounded system defined by set variables and represents the unit of analysis in an inquiry (Merriam, 2009). Bounding a case is important because it helps researchers limit the scope and capacity of collected data ensuring the subject of the case is distinct from the context of the case (Yin, 2014). Case studies investigating one unit of analysis are referred to as *single-case studies*. The research design of this investigation was a qualitative single-case study as the case was defined by one unit of analysis: play as a leading activity. In this study, the case was bound by four set variables: participants' age (7- to 8-year-old children), research setting (digitally-mediated environment in the home), time (outside school hours), and activity (virtual world gameplay via video chat).

Case study research designs typically address a *how* or *why* question (Yin, 2014). A *what* question is often used, however, when investigating a central phenomenon exclusively through qualitative means where the aim of the research is to study a social process or activity (Creswell &

Poth, 2018). In this research, a *what* question was used to investigate a social activity: sociodramatic play. Sociodramatic play is social because "it is social in its nature and in its origin, that is, it arises out of the conditions of the child's life in society" (El'Konin, 2005a, p. 46).

For case study research designs, Yin (2014) suggests the case should be representative of a real-life contemporary social phenomenon, not an abstract concept or hypothesis, and "some theory development as part of the design is highly desired" (p. 37). In this research, the case was reflective of a real-life contemporary social phenomenon, evidenced through my own children (and their real-world friends) who have regularly engaged in the play practice under investigation over many years. Moreover, the case study design employed in this investigation was informed by the cultural-historical theoretical concept of *play as a leading activity* in alignment with an interpretivist paradigm and the cultural-historical approach to research.

4.1.5 Research paradigm

The research paradigm represented in Table 4.1 explains how interpretivist philosophical assumptions suitably addressed the research question in this study.

Table 4.1. Research Paradigm (adapted from Hatch, 2002).

	INTERPRETIVISM	WHAT DOES PLAY AS A LEADING ACTIVITY LOOK LIKE FOR CHILDREN IN A DIGITALLY-MEDIATED ENVIRONMENT IN THE HOME SETTING?
ONTOLOGY *The nature of reality*	*Relativism:* Multiple realities exist as different people have different views of reality.	Child participants, their parents, and the researcher brought different perspectives of social realities to the research setting.
EPISTEMOLOGY *The nature of knowledge acquisition*	*Subjectivist:* Knowledge is acquired through subjectively positioned, social interactions between different people.	Understandings and conceptual knowledge of those in the research setting were informed by different personal experiences of the social situation under investigation.
AXIOLOGY *Values shaping the research*	Research is *value-laden.* Emic perspectives of participants and etic perspectives of researchers are valued equally.	Child participants were honoured as knowledgeable experts in this contemporary form of play. Children's parents had informed understandings about the cultural conditions of the social situation under investigation. The researcher acquired conceptual understandings of the topic through personal experience and by examining the pre-existing theory informing the research.
THEORETICAL FRAMEWORK *Theory informing the research*	*Cultural-historical theory* drawing on the concept of play as a leading activity (Vygotsky, 1978).	Children in separate home settings used *combinatorial activities* to engage in action in imaginary situations in the same virtual world using video chat. This social situation of development gave rise to the psychological function of imagination and formed a foundational basis for play as a leading activity.
METHODOLOGY *Research process*	*Theoretical concepts* are drawn on to inform the methodology. The authentic context of the research setting is prioritised.	A cultural-historical approach to childhood research (Hedegaard & Fleer, 2008) was used to frame a qualitative single-case study design. The unit of analysis was defined as *play as a leading activity*.
METHODS *Data collection and analysis procedures*	*Qualitative, interpretive methods* are used to understand and interpret the context-based data.	Dialectical-interactive research methods (Hedegaard, 2008a) including participant observations, digital video recordings, and semi-structured interviews were employed. Data was analysed using the dialectical-interactive interpretation scheme (Hedegaard, 2008b).
PRODUCT *Format of the report*	Interpretations and understandings from findings are communicated using theoretically-based terms and concepts.	A richly detailed description was reported for readers to gain insight into the defining features and characteristics of play as a leading activity in a digitally-mediated environment. Factors influencing children's ability to engage in this form of play in the home setting were included in this description.

4.2 Methods

To better understand a social activity, interpretivist researchers use methods that focus on its authentic context rather than rely on out-of-context sources (Chowdhury, 2014; Willis, 2007). The cultural-historical approach to research aligns with this philosophy by guiding researchers to employ dialectical-interactive research methods (Hedegaard, 2008a). Dialectical-interactive research methods enable researchers to conceptualise their research activities differently from their participants' activities whilst simultaneously conceptualising themselves as communicative partners within these activities. These types of methods seek to gain insight into how different people in a research setting make meaning from a child's social situation of development. In cultural-historical theory, a social situation of development forms the foundational basis for a leading activity (Kravtsova, 2006). In this research, the child's social situation of development was *action in imaginary situations* forming the foundational basis for the unit of analysis: play as a leading activity.

In the cultural-historical approach to research, different dialectical-interactive methods are used and combined so different aspects of a child's social situation of development are revealed. The researcher's aim is to better understand not only the conditions of the social situation (e.g., by interviewing parents) but also how children are participating in activities within this social situation (e.g., by observing children's interactions). Dialectical-interactive research methods are selected that best address the aim of the research and draw on theoretical preconcepts to inform data collection and analysis procedures. Theoretical preconcepts are formulated according to conceptual relations that categorise patterns of interactivity within a child's social situation of development (Hedegaard, 2008a, 2008b). In this research, theoretical preconcepts underpinning play as a leading activity were formulated to reflect patterns of interactivity within the social situation of development: action in imaginary situations.

4.2.1 Research context

In this research, the social situation of development was facilitated by the synchronous use of virtual world technology and video communication tools by children in separate locations. The research was conducted in the homes of two child participants who used their own digital devices to minimise disruptions to established, familiar digital media ecologies in their households (Nansen, Wilken, Kennedy, Arnold, & Gibbs, 2016). Insight into a child's social situation of development depends on the researcher's communication with the participants (Hedegaard, 2008a). Consequently, I ensured child participants and their parents had a clear understanding of the goals of the research by discussing these at the informal meeting in a public space and initial familiarisation visits.

4.2.2 Participant selection

Qualitative case study researchers select participants based on their ability to provide insight into the phenomenon under investigation (Merriam, 1998). In this research, a convenience sampling strategy was employed to select two 7- to 8-year-old child participants who met the set variables of the case, had parental permission, and were available and willing to be studied (Creswell, 2014). A small sample size is commonly used in qualitative research designs so extensive data can be collected about each individual (Creswell & Poth, 2018). Parents of potential child participants were made aware of this research through the use of an advertisement (see Appendix A). Advertisements have been used in similar studies exploring children's use of virtual worlds (Mavoa et al., 2018; Sarachan, 2013).

In the advertisement, the virtual world software platform required for this research was specified as *Minecraft.* Minecraft is a single or multiplayer game where users role-play as avatars to design and build virtual creations in an online space using visually-represented objects. Minecraft was selected as it is age-appropriate for 7- to 8-year-old children, evidenced by its availability to all government primary schools in various Australian states, including Victoria (State Government of

Victoria, 2019), the state in which this study was conducted. Moreover, the Minecraft game design "does not include an active narrative or set game play objectives" (Lane & Yi, 2017, p. 150) meaning users can create their own imaginary situations. Children's ability to create imaginary situations is core to the concept of play as a leading activity.

The advertisement describing this study was distributed via social media on my personal Facebook page and sent as Multimedia Messaging Service (MMS) messages to friends and family members in my personal network. As a result, a friend's adult son contacted me via e-mail expressing his interest in the research as his daughter fulfilled the criteria described in the advertisement. With permission, he included the contact details of the mother of his daughter's friend who was also interested in participating in the study. I responded by sending Participant Information Letters, Parent Consent Forms, and Child Assent Forms via a pre-written e-mail script (see Appendices B–E) to both parents. Arrangements were made to meet the families informally at a local playground. During this meeting, I explained the aim of the research to the parents and their daughters (Hedegaard, 2008c) and parent consent forms and child assent forms were completed.

4.2.3 Data collection procedures

Interpretivist researchers prioritise qualitative data collection techniques so the accuracy of their interpretations is heightened (Willis, 2007). In this research, qualitative dialectical-interactive data collection procedures were employed based on their capacity to provide insight into different aspects contributing to the social situation under investigation. These included: participant observations, digital video recordings, and semi-structured interviews. This research involved eight home visits, four visits per family conducted over four consecutive weeks during Term 1 of the 2020 school year. The two initial home visits were familiarisation visits to reconfirm parental consent and child assent, select a suitable site for observations, and build rapport and trust with child participants and their families (Hedegaard, 2008c).

During Home Visits 1–4, children were observed and video recorded whilst engaging in online play with each other. During Home Visits 3–6, semi-structured interviews were conducted with the child participants. Parent interviews were also conducted during Home Visits 5 and 6. The home visit schedule is represented in Table 4.2.

Table 4.2. Home visit schedule.

	Week 1	**Week 2**	**Week 3**	**Week 4**
Child Participant 1	**Initial familiarisation visit**	**Home visit 1:** Data collection (Participant observations & digital video recordings)	**Home visit 3:** Data collection (Child interview, participant observations & digital video recordings)	**Home visit 5:** Data collection (Child interview & parent interview)
Child Participant 2	**Initial familiarisation visit**	**Home visit 2:** Data collection (Participant observations & digital video recordings)	**Home visit 4:** Data collection (Child interview, participant observations & digital video recordings)	**Home visit 6:** Data collection (Child interview & parent interview)

4.2.3.1 Participant observations

Participant observations require investigators to adopt an onlooker role but remain open to participating in the events under study (Yin, 2014). During participant observations, interpretivist researchers using the cultural-historical approach to childhood research are active, observant participants who prioritise theoretical preconcepts informing their studies and aim to capture the everyday activities of children (Hedegaard & Fleer, 2008; Willis, 2007). Participant observations are a valued dialectical-interactive research method as researchers can verbally communicate with their participants and may or may not participate in the participants' activities (Hedegaard, 2008a).

In this research, participant observations were used to gain insight into how separately located children engaged in online sociodramatic play. During Home Visits 1–4, children were observed in the main living areas of their homes. I sat adjacent to each child in order to closely view interactions between children themselves and in-world activities of their avatars. This strategy has been used in other studies investigating children's use of digital technologies in the home (Marsh, 2011; Sergi et al., 2017). Child participants were observed for up to 30 minutes per visit reflecting a

feasible time duration suited to 7- to 8-year-old children engaging in virtual world gameplay (Marsh, 2011; Sarachan, 2013). When children's online play sessions extended beyond 30 minutes, I waved to both children to indicate observations were finished, stopped the digital video recording device, and exited the room.

An Observational Protocol (see Appendix F) was used to document children's *play episodes*. Play episodes were recognised when children engaged in sociodramatic play by adopting roles and using symbolic actions, objects, and language in rule-bound imaginary play situations. Play episodes began when children commenced engaging in sociodramatic play and finished when they ceased engaging in sociodramatic play. During participant observations, informal questions were asked (e.g., What is your avatar doing now?), however, disruptions were minimised to ensure play flowed as naturally as possible. The Observational Protocol was structured according to the cultural-historical theoretical preconcepts *topic of play* and *content of play* (El'Konin, 2005a). These preconcepts describe different aspects of the unit of analysis: play as a leading activity.

Topics of play represent real-life activities children recreate through play (e.g., going shopping). Topics of play change and develop over time, particularly for school aged children who are exposed to a broader range of real-life experiences to inform their play. The content of play represents how children reproduce activities and interactions of adults in the societies in which they live reflecting external elements of human activity in terms of their social significance (e.g., shopkeepers exchange goods for money). Although topics and content of children's play vary greatly in imaginary play scenarios, they always depend on children's real-life social and cultural conditions. In this research, the cultural conditions of children's imaginary play scenarios were subject to immaterial resources available within the Minecraft game design. Subsequently, topics of children's play identified real-life situations being reproduced in a virtual world environment and the content of play described how children were reproducing activities and interactions reflective of the topic through in-world activities.

The Observational Protocol included sections for researcher notes and researcher reflections. Interpretivist researchers guided by the cultural-historical approach value the researcher's perspective in a research context. It is important, therefore, for researchers to document their activities as they play a different role and have different perspectives from their participants (Fleer, 2008a). In this study, researcher notes were recorded during observational home visits (1–4) to inform factors affecting the research context, such as clarifying children's in-world behaviours (e.g., unintentional avatar actions) or noting unexpected interruptions (e.g., technical issues disrupting play). Researcher reflections such as thoughts, feelings, and ideas about in-field experiences were recorded after each observational home visit (e.g., positioning recording device to minimise obstructions). Researcher reflections are often used in qualitative case study designs so investigators can introspectively record experiences in the field and reflect on the successes and limitations of the methodological approach (Merriam, 1998). Raw data from Observational Protocols were digitised within 48 hours of home visits to retain their quality.

4.2.3.2 Digital video recordings

Filming elements of a research setting enables researchers to capture sophisticated and complex data in real time (Merriam, 2009). In the cultural-historical approach to childhood research, video recorded footage is considered a valuable data source for three key reasons (Fleer, 2008b). Firstly, it visually documents different aspects of everyday activities and institutional practices of children. Secondly, it enables researchers and their participants to view visual evidence of a child's social situation through different perspectives. Thirdly, video footage can be repeatedly viewed enabling researchers to "rearrange their observations and interpretations as themes evolve" (Fleer, 2008b, p. 114).

In this research, a single digital video recording device (iPad) secured on a tripod captured the dynamics of children's play episodes as they evolved and unfolded. During the initial home familiarisation visit, child participants were asked to assist with selecting a suitable position for the

iPad to promote their familiarity with the device (Waters & Waite, 2016). The iPad was used to record children's play episodes during Home Visits 1–4.

There were two specific aims for using a video recording device in this study. First, I was able to select specific excerpts reflective of the unit of analysis (play as a leading activity) to view with child participants during the next home visit. There were 10–13 video excerpts garnered from each home visit and these enabled me to elicit children's perspectives about what was occurring in the footage. Second, audio and visual data related to children's play episodes were captured in real time. In terms of audio-related data, verbal discourse between child participants was captured and in terms of visual-related data, in-world activities of children's avatars were captured, in addition to non-verbal behaviours and facial expressions of the physically present child participant. All audio-related data and relevant visual-related data (e.g., children's facial expressions during gameplay, in-world actions of avatars) from video recorded footage were digitally transcribed within 48 hours of home visits and transferred to digital file format.

4.2.3.3 Semi-structured interviews

Semi-structured interviews are highly valued in qualitative case study research designs as they reflect "guided conversations rather than structured queries" (Yin, 2014, p. 110). They are particularly useful when using a small sample as the "crucial factor is not the number of respondents but the potential for each person to contribute to the development of the insight and the understanding of the phenomenon" (Merriam, 1998, p. 83). A semi-structured approach is a valued dialectical-interactive research method as researchers and their participants can simultaneously access each other's activity settings through flexible verbal discourse where researchers may ask questions and respond to participants' questions (Hedegaard, 2008a).

Research underpinned by interpretivist assumptions aims to gain insight into unique, individual perspectives of different people in a research setting (Willis, 2007). For researchers employing dialectical-interactive research methods, these include the child's perspective and the

institutional perspective about a social situation under investigation. In this research, semi-structured interviews were used to elicit the child's perspective and the institutional perspective (via their parents). Seeking the child's perspective is important because valuable insight is gained into children's activities within a social situation of development (Hedegaard, 2008b). Seeking the institutional perspective is important because it deepens understanding into practices that facilitate the social situation of development (Fleer, 2008a).

During Home Visits 3–6, audio recorded one-on-one semi-structured interviews were conducted with each child participant. These interviews occurred whilst children viewed selected excerpts of video recorded footage from the previous home visit so their recollections of play episodes would be heightened. During interviews, open-ended questions (e.g., Where did you get the idea for this?) were posed carefully and sensitively (Hafner, 2015) to elicit children's perspectives about factors contributing to the social situation of development: action in imaginary situations. These interviews also enabled children to elaborate on aspects of collected data (Sergi et al., 2017) such as clarifying in-world activities and interactions. This method is considered particularly useful in studies involving virtual worlds as participants can reflect on their avatars' actions and describe gameplay based on their own understandings (Savin-Baden & Tombs, 2017).

Upon completion of child interviews during Home Visits 5 and 6, open-ended questions were used to conduct audio recorded semi-structured interviews with one of the child's parents (e.g., What prompted your child to begin engaging in virtual world gameplay via video chat?). The aim of the parent interviews was to gain insight into how beliefs, values, and attitudes of children's parents influenced social practices and cultural conditions of the social situation under investigation. All interviews began with a brief description of the research context and were guided using separate child and parent interview schedules (see Appendix G). Child interviews ranged from 11–18 minutes and parent interviews ran for approximately 15 minutes. I digitally transcribed

all interviews to heighten my familiarisation with the raw data and ensure subject-specific terminology was accurately represented (Merriam, 2009).

4.2.4 Data analysis procedures

Qualitative case study research designs underpinned by interpretivist philosophical assumptions see data collection and analysis as a simultaneous, iterative process arising from an investigator's social interactivity with participants in a research setting (Willis, 2007; Merriam, 2009). In alignment with this philosophy, data in this research were analysed using the dialectical-interactive interpretation scheme (Hedegaard, 2008b). This scheme represents a structured approach to data analysis where the research aim directly connects to theoretical preconcepts and concrete data.

By adopting the dialectical-interactive interpretation scheme, researchers can formulate theoretical insight to answer a research question by composing separate *research protocols*. Research protocols represent systemised models of different dialectical-interactive research methods used during data collection. In this research, three separate research protocols were created using digitised transcriptions from the participant observations, video recorded footage, and interviews. The dialectical-interactive interpretation scheme requires research protocols to be considered in relation to children's activities and outside factors affecting these activities. Research protocols are combined and analysed via an iterative three-level systematic process. These three levels are: 1) common sense interpretation; 2) situated practice interpretation; and 3) interpretation on a thematic level.

The first level of analysis, common sense interpretation, sees investigators drawing on observational data to objectively comment on relational interactivity between participants. Interactional patterns are identified and these are later validated by the participants themselves. The second level of analysis, situated practice interpretation, sees researchers making links between observational data generated over several visits to the research setting. These interpretations focus

on activities of participants in relation to the aim of the research and theoretical preconcepts so conceptual understandings about motives, competencies, and intentions of individual participants are revealed and interactive patterns, including conflicts, between participants are identified. The third level of analysis, interpretation on a thematic level, sees researchers formulating categories by drawing on interpretations derived from the first two levels of analyses. These categories represent meaningful, relational data patterns that directly link to the aim of the research.

In this research, the dialectical-interactive interpretation scheme was used to analyse how children participated in the social situation of development under investigation–action in imaginary situations–according to the four 'ways' combinatorial activities give rise to play as a leading activity described by Vygotsky (2004). These 'ways' are: 1) Life experiences inspire imaginative thought; 2) Products of imagination connect to reality in meaningful ways; 3) Emotional connections are made to products of imagination; and 4) Products of imaginative thought manifest in real ways. Institutional factors influencing these activities (e.g., how children gained access to software platforms) were also analysed. After Home Visits 1–4, common sense interpretation was used to objectively identify relational interactivity between children as evidenced within the first two research protocols generated from field observations and video recorded footage (e.g., see example in Figure 4.1).

LEVEL 1 ANALYSIS – PLAY EPISODE 1: SHOOTING BATTLE

DATA COLLECTION HOME VISIT 1		12-02-2020
Field Observations	**Video Footage Transcript**	**Play-based Interactions**
Talia's avatar appears on Louise's screen and it is still holding the bow and arrow from the underground challenge. Louise laughs and selects a bow and arrow from her inventory. She starts firing arrows at Talia's avatar. Talia begins shooting arrows back at Louise's avatar.	(*Talia's avatar comes into view holding a bow and arrow*) Louise: (*laughs, her avatar holds up a bow and arrow and shoots at Talia's avatar*) I'm trying to shoot you! Shooting battle! Jane: What's she got, a bow and arrow? Louise: Oh, a shooting battle (*quickly gets a crossbow from her inventory*). Crossbow. I got a crossbow. I'm shooting you with it. (*The girls' avatars are shooting arrows at each other*). Louise: Wait, I wanna try doing something. (*Talia continues shooting arrows at Louise's avatar*) Wait, Talia, just wait. (*Louise browses through the different types of arrows available*).	Talia's avatar appears on Louise's screen and Louise can see it is still holding a bow and arrow from the bullseye challenge. Louise immediately starts shooting arrows at Talia's avatar. Talia returns fire and the girls engage in what Louise refers to as a 'shooting battle'. Louise is laughing as she fires arrows at Talia's avatar.

Figure 4.1. Example of Level 1 analysis process.

Then, situated practice interpretation was used to analyse combinatorial activities children used as they engaged in online sociodramatic play. Interim findings from the first two levels of interpretation were validated or adjusted during child interviews on Home Visits 3–6. Upon completion of home visits, the third research protocol generated from these interviews was used to provide contextual information about specific combinatorial activities children used during play (see example in Figure 4.2).

LEVEL 2 ANALYSIS – PLAY EPISODE 1: SHOOTING BATTLE

Play-based Interactions	Interview Data	Combinatorial Activities
Talia's avatar appears on Louise's screen and Louise can see it is still holding a bow and arrow from the bullseye challenge. Louise immediately starts shooting arrows at Talia's avatar. Talia returns fire and the girls engage in what Louise refers to as a 'shooting battle'. Louise is laughing as she fires arrows at Talia's avatar.	**Interview 1 – Louise:** *(Video excerpt #2 plays – shooting battle)* Jane: So that was good that shooting battle, do you ever do that in real life like with water pistols or have you ever been to Laser Force? Louise: No. Jane: Or Nerf guns, have you ever tried those? Louise: (*shakes head to indicate no*) Jane: So, you only do shooting battles in Minecraft? Louise: Minecraft, yeah.	**WAY 1: Life experiences inspire imaginative thought** Using bows and arrows in a virtual world inspired Louise to create an imaginary situation - a shooting battle with Talia. Louise has only used bows and arrows in Minecraft. She has not used shooting toys in the real world.

Figure 4.2. Example of Level 2 analysis process.

Interpretation on a thematic level involved drawing on the three research protocols to inductively code meaningful themes and patterns reflective of children's actions in imaginary situations. A category scheme was created using a priori deductive codes based on Vygotsky's four combinatorial activities. Data relating to the second combinatorial activity, *Products of imagination connect to reality in meaningful ways*, were informed by the Australian Curriculum (Foundation–Year 3) Science, Mathematics, English, and Humanities and Social Sciences documents (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2018). *Foundation* is the term used in Australia to describe children's first year of formal schooling. These four curriculum documents relate to early school age children (5- to 9-years-old) and were used in this research to reflect the age of the child participants.

The coding process was digitally managed using NVivo® data analysis computer software and codes were inductively recontextualised to answer the research question (see Figure 4.3).

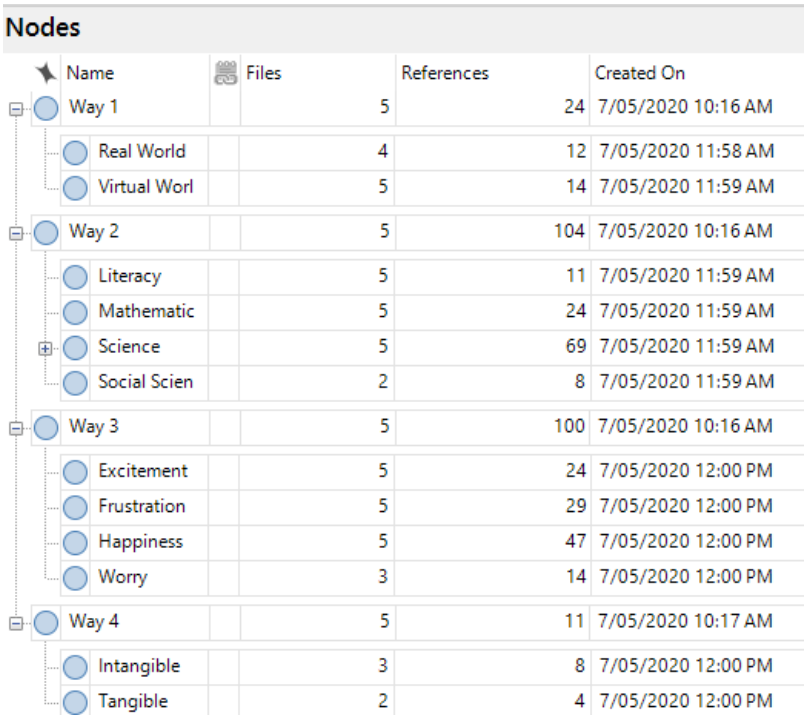

Figure 4.3. Category scheme created using NVivo software.

4.3 Ethical considerations

This research project (application number 2019-203H) received approval from the Australian Catholic University Human Research Ethics Committee (ACU HREC) and was guided by four ethical principles prescribed by the National Health and Medical Research Council (NHMRC, 2018): research merit and integrity, justice, beneficence, and respect.

The first principle, research merit and integrity, ensures a research project contributes new knowledge to its relevant field through honest, ethical practices. A review of current scholarly literature suggested a gap in the knowledge regarding the topic of this study. As the investigator, I was committed to honest, ethical research practices, recently exhibited through professional experience as a research assistant. I ensured this study had merit, rigour, and integrity whilst

maintaining respect for the participants and the research setting at all times (Creswell, 2014). My professional experience as a primary school teacher brought an informed knowledge of the cognitive capabilities of 7- to 8-year-old children, an essential requirement when studying how children participate in their social worlds (Corsaro, 2015). My personal experience as a parent brought conceptual understandings of the research topic as my own children have regularly engaged in the play practice under investigation over many years.

The second principle, justice, values the equal, fair, lawful treatment of participants. Children are vulnerable participants as their maturity levels are still developing. As such, my *Working with Children Check* card was shown to children's parents and they were asked to remain within the home during all visits. The research setting was approved by child participants and their parents so the needs of all family members were respected. Family members were informed that a video camera was being used during home visits to avoid potential breaches of privacy (Nansen et al., 2016). Participating families had the same number of home visits. In this research, children used the version of Minecraft they regularly access with parental consent. Children were not exposed to inappropriate in-world behaviours from unknown players during gameplay as the version of Minecraft used in this study is not publicly accessible.

The third principle, beneficence, prioritises the welfare of participants, minimises risk of discomfort or harm, and maximises positive outcomes of research. Family homes are private, valued spaces, so approved access was sought using parent consent and child assent forms prior to home visits commencing. Consent was an iterative, dialogical process, garnered from parents before each home visit and from child participants before data collection procedures began using a Record of Child Verbal Assent form (see Appendix H). Establishing trust with families was imperative and I was conscious of the sensitive intricacies of family relationships (e.g., siblings interrupting play) and responded appropriately (e.g., pausing the video recording device). The well-being and comfort of child participants and their families was paramount, so parents were made aware that scheduled

visits could be cancelled or postponed at any time. Child participants were advised observations may be ceased at any time and I was cognizant of non-verbal signs suggesting children were uncomfortable with being observed (Burnett & Merchant, 2014).

The fourth ethical principle, respect, recognises the value of participants and all others within the research setting. A power imbalance exists between adults and children (Corsaro, 2015; Creswell, 2014) so I established a friendly, respectful rapport with children by being non-intrusive, flexible, and deeply aware of, and responsive to, their needs (Hedegaard, 2008c). The privacy and cultural practices of child participants and their families were respected at all times. Child participants were made aware that all collected data was confidential and their anonymity was assured through the use of pseudonyms for themselves and their avatars, which can be traceable via online means (Henderson, Johnson, & Auld, 2013). Interviewed parents were also assigned pseudonyms. Children and their parents were made aware they could approve all collected data. Video footage generated from this study will be not published for any purpose and all raw data is stored in a password-protected university hard drive and deleted from recording devices.

4.4 Qualitative rigour

It is essential research studies are conducted rigorously to assure the validity and reliability of the investigation (Merriam, 2009). For qualitative research designs, validity refers to the extent to which a study's findings are accurate according to the researcher, the participants, and the readers and/or reviewers of the final report (Creswell & Poth, 2018). The reliability of qualitative research refers to how well the study's findings consistently and dependably reflect collected data (Merriam, 2009). For qualitative research studies guided by the cultural-historical approach, concepts of validity and reliability are reformulated to reflect the use of dialectical-interactive research methods (Hedegaard, 2008a).

According to dialectical-interactive methodology, validity conceptualises practices of the social situation under investigation according to different perspectives of those in the research

setting. These practices are based on the researcher's motives for and understandings of their research as derived from theoretical preconcepts, in addition to motives and understandings of participants. Reliability in the dialectical-interactive methodological approach is determined by ensuring a balanced approach is adopted by the researcher during all social interactions within the research setting. This allows for meaningful and insightful understandings to be gained through shared, reciprocal, communicative discourse where the researcher's motives and intentions are clearly separated from participants' motives and intentions (Hedegaard, 2008c).

The validity and reliability of this research was heightened by adhering to dialectical-interactive research methods. For validity, this meant accurate, conceptualised descriptions of the unit of analysis were viewed through individual perspectives of child participants, their parents, and the researcher. The validity of this research was also heightened by my experiences as a parent and primary school teacher. According to Willis (2007), findings from interpretivist research is heightened if the researcher has an informed knowledge of the research context and related contexts. To further assure the validity of this research, member checking was conducted during interviews with children and their parents. This process heightens the validity of a study as research participants provide feedback about emerging findings to improve accuracy of a researcher's interpretations (Creswell, 2014). During interviews, children and their parents were asked to provide feedback about preliminary interpretations of data collected through observations and video recordings so they could confirm these interpretations or suggest "some fine-tuning to better capture their perspectives" (Merriam, 2009, p. 217). Informal questioning was also used with children for member checking purposes during observations to ensure the duration of child interviews were manageable for young children (Hedegaard, 2008c). Reliability in the dialectical-interactive research approach is assured by generating different research protocols. In this study, research protocols were transcribed accurately to maintain their quality and stability (Creswell & Poth, 2018).

4.5 Assessing risk

The National Health and Medical Research Council (2018) mandates a risk assessment be completed before research involving human participants is conducted. This means researchers must identify potential harms, inconveniences, or discomforts their investigation might cause participants. In this research, several low risk outcomes were identifiable. A foreseeable risk was one of discomfort for participating children to have a researcher visit their home. This risk was minimised by meeting with children and their parents in a public space prior to commencement of home visits so I could establish a friendly, respectful rapport with the families. Home visits may be considered inconvenient so the initial familiarisation visit was used to confirm my contact details with parents should the need for rescheduling arise.

Other foreseeable risks included possible induced anxiety during data collection and potential for embarrassment caused by negative interactions with peers, family members, or in-world activities. When such events occurred (e.g., a child participant becoming annoyed when her younger sibling entered the research setting) data collection procedures were paused or ceased immediately. A further risk existed for myself as the researcher entering the private homes of child participants. This risk was minimised by sending text messages to the principal investigator prior to my entering the homes and upon exiting the homes. Text message details included the home address of participating families and the time the home was entered and exited. This foreseeable risk strategy was approved by the ACU HREC.

4.6 Limitations

The findings of this research were reported in light of certain limitations. Firstly, the vulnerability of children is heightened when their digital practices "push the boundaries of adult understanding" (Standlee, 2017, p. 328). This was addressed by positioning child participants as "experts in the use of their own media culture" (Marsh, 2011, p. 105). Secondly, the presence of authority figures, such as adults, in a research setting potentially restricts authentic social

interactions between children (Sarachan, 2013). Subsequently, in this research, participant observations were as discreet as possible and play episodes were observed, not directed. Similarly, using a video recording device may impact children's behaviour so child participants were invited to approve its position during home visits to ensure it remained as unobtrusive as possible. Thirdly, when children use digital technologies, Mawer (2016) warns their behaviours may be misinterpreted, such as where they are directing their attention and the impact of technical issues. Consequently, informal questioning (e.g., Why did your avatar do that?) and notations (e.g., Child A accidentally broke Child B's structure) were used to clarify these behaviours.

Conclusion

In this chapter, the methodology of this research was explained as being underpinned by interpretivist philosophical assumptions and guided by the cultural-historical approach to childhood research. The research design was identified as a qualitative single-case study with the case (unit of analysis) defined as *play as a leading activity*. Research methods were outlined, including a description of the research context and participant selection process, with data collection and analysis procedures accredited as being informed by dialectical-interactive research methodology. The chapter concluded with an explanation of the ethical considerations and factors contributing to the rigour, risks, and limitations of this study. The next chapter will outline findings emerging from this research resulting from strict adherence to the methodological process. Findings will describe how child participants in this study used the psychological function of imagination to give rise to play as a leading activity in a digitally-mediated environment and identify important factors influencing children's ability to engage in this contemporary form of play.

Chapter 5 Findings

Introduction

In this chapter, findings emerging from this investigation will be presented in relation to the research question:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

The findings will provide new knowledge about the nature of online sociodramatic play for separately located children using networked digital technologies with a specific focus on how children in this research used their imagination to give rise to this contemporary form of play. This chapter is comprised of three sections. In the first section, the research context is described, including information about the child participants and their online play episodes. In the second section, factors affecting the social situation under investigation are identified to illuminate insight into how this form of play was facilitated in the home settings of the child participants. In the third section, findings from analysed data are reported according to the ways reality and imagination interrelate to underpin play as a leading activity in a digitally-mediated environment. The chapter concludes with a summary of key findings emerging from the research.

5.1 Research context

This research was conducted in the home settings of two female child participants during February and March, 2020. Children used the *Minecraft: Education Edition*® software platform in *Creative mode* (see Glossary) and the *FaceTime*® video communication tool synchronously to engage as avatars in the same virtual world environment whilst physically situated in separate home settings. Minecraft: Education Edition is a modified adaptation of the general, publicly available version of Minecraft and only accessible through educational institutions.

Children in this research used their own iPad devices to engage in online play with each other, viewing in-world activities from a first-person perspective as an embodied avatar with

Minecraft: Education Edition and FaceTime appearing on the same screen. An example of what this looks like is represented in Figure 5.1.

Figure 5.1. An example of how Minecraft: Education Edition and FaceTime are used synchronously from a user's perspective.

In this chapter, photos used to illustrate Minecraft: Education Edition in-world environments and symbolic objects accessed by children in this research were generated from the researcher's personal family accounts and are not representative of data collected in the research setting.

5.1.1 Child participants

The two female child participants involved in this research are Talia and Louise (both names are pseudonyms). Talia (7-years-old) and Louise (8-years-old) live in neighbouring suburbs in regional Victoria, attend Year 2 at the same local primary school, and have been friends in the real-world for two years. They commenced engaging as avatars using Minecraft: Education Edition via video chat in January, 2020. While both girls also have access to the publicly available version of Minecraft, their parents do not allow them to interact in the same in-world environment through this software platform due to online safety concerns (Researcher Reflections, Home Visit 1).

Both Talia and Louise have younger siblings who recently started school. Talia's younger sister does not play Minecraft, however, she enjoyed watching Talia's online play sessions with Louise during home visits, showing interest in in-world activities (Researcher Notes, Home Visit 2). During the second home visit, Talia's sister asked, "Where is Louise?" Talia responded,

"Louise's there," as she pointed to Louise's avatar in the in-world environment, not the FaceTime screen (Video Transcript, Home Visit 2, p. 14). Talia's father, John (pseudonym), who is a teacher in a public school, recently set up his own Minecraft: Education Edition account. In the parent interview, John explained how Talia helped him learn to navigate the in-world environment. "It was really interesting seeing her take leadership of it and show me how to do it," he recounted (Parent Interview, John, p. 5).

Louise and her younger brother regularly sit together and play the general, publicly accessible version of Minecraft on separate iPads, but they do not interact as avatars in the same in-world environment. The school Louise and Talia (and their younger siblings) attend offers students from Year 1 access to Minecraft: Education Edition, meaning Louise's brother cannot access this version until 2021. Louise's mother, Michelle (pseudonym), believes playing in separate Minecraft worlds is "not as good" as engaging as avatars in the same in-world environment (Parent Interview, Michelle, p. 7). In the parent interview, Michelle described how Louise recently connected her iPad to the home television to teach her brother how to *spawn* (see Glossary) creatures in Minecraft. "He loved it!" Michelle recalled. "He's all about spawning things now–only the scary creatures!" (Parent Interview, Michelle, p. 7).

Louise also regularly plays Minecraft: Education Edition via video chat with various other classmates. Michelle explained how Louise often organises these online playdates at the school gate by saying, "Goodbye, we're going to meet on Minecraft this afternoon!" (Parent Interview, Michelle, p. 4). Michelle said Louise enjoys sharing her Minecraft creations with her friends during these sessions. Video recorded data from the first home visit indicated Louise enjoys playing online with other children. "I wanna play together again!" she said to Talia when technical issues interrupted play (Video Transcript, Home Visit 1, p. 11).

5.1.2 Technical issues affecting the research context

Two technical interruptions caused problematic issues within the research context. Firstly, children had difficulty connecting as avatars in the same in-world environment resulting in delayed and disrupted play during all home visits. This issue was resolved, however, by restarting the Minecraft: Education Edition software platform. Secondly, internet connectivity in the children's homes affected video quality of the FaceTime connection during Home Visits 2–4 (Researcher Notes, Home Visits 2, 3, & 4). As a result, children had difficulty seeing each other's faces during these online play sessions. Audio quality was unaffected, however, meaning children could continue verbally communicating with each other. The obscured FaceTime screen did not seem to affect the quality of children's interactive play as four play episodes emerged during these home visits. Interestingly, children rarely made eye contact with each other during online play sessions, preferring to focus on in-world activities, and often relocated the FaceTime screen to access game-related information, at times hiding it altogether. They did, however, greet each other (and myself) through the FaceTime screen before commencing online play sessions (Researcher Notes, Home Visits 1–4). Despite technical interruptions, five separate play episodes were successfully identified over the course of the four observational home visits.

5.1.3 Play episodes

In this research, *play episodes* were recognised when children adopted roles and used symbolic actions, objects, and language to engage in rule-bound imaginary play situations with each other. Play episodes were classified according to different aspects describing the unit of analysis: play as a leading activity. These aspects were: *topic of play* and *content of play* (El'Konin, 2005a). The topic of play described real-life activities children recreated through play, for example, a horse-riding adventure. The content of play described how children reproduced activities and interactions of adults in the societies in which they live, for example, packing supplies to take on a horse-riding adventure. A summary of the five play episodes is recorded in Table 5.1.

Table 5.1. Record of children's play episodes.

Play Episode	Topic of play	Content of play	Time
1	Shooting battle	Children's avatars used bows to shoot arrows at each other and tried to avoid arrow fire by hiding.	7m 45s
2	Horse-riding adventure	Children's avatars packed supplies then embarked on a horse-riding adventure into a forest.	22m 30s
3	New world exploration	Children's avatars explored an underground cave and an above ground island.	16m 10s
4	Underground mining	Children's avatars looked for diamonds in an underground tunnel then mined the diamonds.	13m 30s
5	Village exploration	Children's avatars explored various features of a village.	12m 30s

At the beginning of Home Visit 1, children completed four 'challenges' that involved playing rules-based games (e.g., navigating a maze, shooting arrows at bullseye targets) to unlock the hidden world where Play Episode 1: Shooting battle took place. As rules-based games do not represent the unit of analysis: play as a leading activity, all challenge-related data were excluded from analysis. In cultural-historical theory, children's actions during imaginary play situations are subject to two specific conditions: an aim and an operation (Leontyev, 2009). While the aim reflects the purpose of the action (e.g., the child wants to ride a horse), the operation reflects the means by which the aim is realised (e.g., the child's avatar puts a saddle on a virtual horse and mounts it). During rules-based games, however, the aim of children's actions remains unchanged as it is dictated by the rules of the game, thus preventing their ability to create imaginary situations.

For play to be considered a leading activity, it must involve the creation of an imaginary situation through symbolic role-based actions and be free of obligatory behaviour or actions determined by operational conditions of rules-based games. In this research, children engaging in action in imaginary situations represented the social situation of development under investigation as this activity gave rise to play as a leading activity whereas rules-based games did not.

5.2 Factors influencing the social situation of development under investigation

In this research, data analysis procedures were informed by the dialectical-interactive interpretation scheme (see Ch. 4, p. 84–85). This scheme requires researchers to consider how outside factors might affect children's activities within the social situation of development under investigation. In this study, the social situation under investigation was *action in imaginary situations,* enabled through the synchronous use of virtual world technology and video communication tools. For Louise and Talia, this social situation was facilitated by influential factors within two specific institutions (see definition in Ch. 4, p. 72): their respective homes and the school they both attend.

5.2.1 Influential factors in the home

A significant home-based factor influencing the social situation under investigation in this research involved parents allowing their daughters to communicate with each other via iMessage®, a text-based chat software platform. Access to iMessage allowed access to FaceTime which prompted Louise and Talia to independently start communicating with each other via video chat. Louise's mother, Michelle, recalled this progression. "The next thing you know, the girls are on FaceTime!" she explained. "They'd be playing their apps and talking through what they were doing" (Parent Interview, Michelle, p. 2). Both Michelle and John value their children's use of FaceTime to engage in real-time communication during online play in Minecraft.

For Michelle, video chat enables Louise to freely explore in-world virtual environments without disrupting her play experience to communicate via text-based chat. John believes text-based chat would cause frustration and miscommunication between the girls, regarding video chat as a platform for them to discuss their gameplay and solve problems together in real-time. John elaborated, "Real-time communication makes it a bit more of a familiar experience for them, so they're talking to each other like they talk to each other in a real playground" (Parent Interview, John, p. 3).

Another home-based factor influencing the social situation under investigation is the value children's parents place on this online play activity. John regards Minecraft as a valuable outlet for Talia to express her creativity and believes by sharing this play experience with Louise, a more experienced player, she is encouraged to learn more about aspects of the game. John explained, "There's a good balance with creativity and also problem-solving skills, but it just adds a different level when she's able to catch up with friends and explain things a bit more" (Parent Interview, John, p. 7). Moreover, for John, getting Talia and Louise together for a real-world playdate is often logistically difficult. "It is pretty hard to catch up and supervise their play, so we are really happy that they can find another way to interact with each other," he said (Parent Interview, John, p. 7).

Michelle considers the girls' playful online engagement in Minecraft comparable to their play in the real world. "I think it sounds like real-life play," she said. "Like, if I didn't know that they were playing on the iPad, I would assume that they were playing as they always play" (Parent Interview, Michelle, p. 9). While influencing factors in the home were crucial in facilitating children's ability to engage in action in imaginary situations in an online space, various equally-important school-related factors significantly influenced the social situation under investigation.

5.2.2 Influential factors at school

Educational professionals at the school Talia and Louise attend ensured they had access to an iPad device (the school implements a *Bring Your Own Device* iPad program) and the Minecraft: Education Edition software platform. John recalled Talia and her classmates were able to access this version of Minecraft as an elective 'sign-up' activity on Friday afternoons at school. He recounted how Talia enjoyed these sessions as "she could go and see worlds of other kids" (Parent Interview, John, p. 2). John believes the supported environment at Talia's school "made a real difference" in heightening her skill development and enthusiasm for playing Minecraft (Parent Interview, John, p. 5). He explained, "That was one of the advantages of her using it at school . . . it made her want to use it a bit more" (Parent Interview, John, p. 2).

During observational home visits, it was evident child participants had received school-based instructional guidance about generating and entering codes consisting of four Minecraft-specific images (e.g., map, pickaxe) to successfully enter the same in-world environment (Researcher Notes, Home Visit 1). In Term 4, 2019, Talia and Louise were permitted to take their Minecraft: Education Edition login details home meaning they could access their school account in their separate home settings and use their knowledge of how to enter the same in-world environment to engage in online play with each other. Michelle recalled Louise being very excited the day she brought her login details home. While Michelle and John could not recall receiving information about how Minecraft: Education Edition was used at school or how it might be used at home, both parents reported receiving information from the school regarding cybersafety practices and iPad safe handling procedures.

5.3 Combinatorial activities in a digitally-mediated environment

To successfully engage in play as a leading activity, children need to draw on the psychological formation of imagination. According to cultural-historical theory, imagination operates through four creative processes known as *combinatorial activities.* Combinatorial activities are internally-motivated, future-oriented, psychological mechanisms children draw on to creatively combine and rework previous life experiences through imaginative thought (Vygotsky, 2004). Fundamentally, combinatorial activities represent the ways imagination and reality interrelate to underpin play as a leading activity. These combinatorial activities are: 1. Life experiences inspire imaginative thought; 2. Products of imagination connect to reality in meaningful ways; 3. Emotional connections are made to products of imagination; and 4. Products of imaginative thought manifest in real ways. In this research, data were analysed according to the four combinatorial activities children used to give rise to play as a leading activity in a digitally-mediated environment.

5.3.1 Life experiences inspire imaginative thought

The first combinatorial activity is based on the understanding that imaginative thought is inspired by previous life experiences. This means children use and combine real and fantastical elements of their social and cultural realities to create imaginary play situations. A key finding in this research suggests children draw on life experiences from the real world and a virtual world to inspire imaginative thought during online sociodramatic play.

5.3.1.1 Real world experiences

Data from all play episodes indicated children's imaginative thought was inspired by real world experiences. In this research, *real world experiences* are defined as experiences children encounter in the real world facilitated by adults within the societies in which they live. In Play Episodes 1 (Shooting battle), 2 (Horse-riding adventure), and 5 (Village exploration), children spawned, named, cared for, and/or rode horses. Interview data revealed, in the real world, Louise loves horses and attends horse-riding lessons:

> Jane: So, you wanted to spawn a horse, why did you want to do that?
> Louise: Cause I love horses.
> Jane: And what about horses in real-life? Have you ever been on a horse ride or a pony ride?
> Louise: Yes, I go to horse riding.
>
> (Interview 1, Louise, p. 4)

Talia, too, loves horses in the real world, however, her horse-riding experience is limited as indicated in two interview data transcript excerpts:

Excerpt 1:

> Jane: What kind of animals do you like taming in Minecraft?
> Talia: Dogs and horses.
> Jane: Have you got favourite animals that you love in real life?
> Talia: Horses.
>
> (Interview 2, Talia, p. 4)

Excerpt 2:

> Jane: So, you and Louise are riding horses here, have you ever ridden a horse in real life or a pony?
> Talia: I rode a pony at the (school) show . . . I want to ride an actual horse.
>
> (Interview 1, Talia, p. 6)

This data suggested children's experiences with real-life horses in the real world inspired them to include symbolic horses within imaginary play situations in a virtual world. An example of how a Minecraft user views in-world environments whilst riding a virtual horse is represented in Figure 5.2.

Figure 5.2. How a user views in-world environments whilst riding a virtual horse in Minecraft.

In all play episodes, Louise made her avatar fly and/or become invisible. In her first interview, Louise explained how she enjoyed watching the first three Harry Potter® movies and knows the main character, Harry, flies on a broomstick and becomes invisible using an invisibility cloak (Interview 1, Louise, pp. 1–2). In Play Episode 2: Horse-riding adventure, Talia adopted a princess role, and in Play Episode 5: Village exploration, she adopted a queen role. Interview data indicated, in the real world, Talia often plays 'queens and princesses' with her younger relatives (Interview 2, Talia, p. 5) and her favourite Disney® princess character is Elsa from the movie Frozen® (Interview 1, Talia, p. 5). In the first Frozen movie, Elsa is a princess who later becomes a queen, and in the sequel, Queen Elsa tames a wild horse. This data indicated children's ability to imitate favourite fictional characters from movies viewed in the real world inspired imaginative thought in a virtual world.

5.3.1.2 Virtual world experiences

Data emerged from all play episodes suggesting children's imaginative thought was also inspired by virtual world experiences. In this research, *virtual world experiences* are defined as

experiences children encounter in a virtual world environment facilitated by adult designers of the gaming platform. In Play Episode 1: Shooting battle, Louise saw Talia's avatar holding a bow and arrow, prompting her to start shooting arrows at it. "I'm trying to shoot you!" Louise cried. "Shooting battle!" (Video Transcript, Home Visit 1, p. 5). Interview data revealed Louise has never used simulated 'shooting' toys (e.g., bow and arrow, water pistol, foam dart gun) in the real world, only in Minecraft (Interview 1, Louise, p. 2). This data suggested children used symbolic objects available in a virtual world to inspire imaginative thought.

Data from four play episodes indicated children also used features of in-world environments to inspire imaginative thought. In Play Episode 2: Horse-riding adventure, children's avatars were riding horses in a small village surrounded by a sprawling forest when Louise asked, "Talia, do you want to go on an adventure?" (Video Transcript, Home Visit 2, p. 9). Interview data indicated Louise and Talia only pretend to go on adventures in Minecraft, not the real world (Interview 1, Talia, p. 6). Similarly, in Play Episode 3: New world exploration, swimming in a deep ocean prompted Louise to say, "I wanna take an underwater selfie!" In her second interview, Louise explained she only ever takes *selfies* (see Glossary) in Minecraft, not the real world (Interview 2, Louise, p. 4). Moreover, in Play Episode 4: Underground mining, exploring a tunnel prompted Louise to adopt a miner's role. "I wanna go look for diamonds!" she told Talia, who proceeded to assist her with this mission (Video Transcript, Home Visit 4, p. 3). During Play Episode 5: Village exploration, a large wooden and cobblestone structure known as a *Pillager outpost* (see Glossary) on the outskirts of a village inspired Louise to dress her avatar in a queen-like *skin* (see Glossary) and imagine this structure was her 'castle' (see Figure 5.3 for examples of these symbolic objects).

Figure 5.3. Examples of the Pillager outpost (on left) and 'queen' skin (on right).

Talia also engaged in this imaginary play situation as captured in video transcript data:

Talia: Why is there a big house here? Did you build that? Or is it somebody else, or the Minecraft?
Louise: Oh, I built it. Cause I am queen and this is my castle (*in an affected tone*).
Talia: Wait, what?
Louise: Yaass, this is my castle (*in an affected tone*).
Talia: Hmmm (*changes her avatar's skin to the same 'queen' skin Louise's avatar is wearing*). I'm queen!
Louise: No, this isn't actually mine.
Talia: I am queen, wahahaha (*in an affected tone*). OK, yeah, I'm queen of this castle, not Louise (*loudly*). Louise can never be queen of this castle! (*smiling*)
(*Text appears on Talia's screen from Louise: 'I will kill Talia. haha')*
Louise: Even though I just said that… oh I will kill Talia, hahahaha (*in a menacing voice*).
Talia: *(Later in the play episode)* I'm on a horse. I don't want to be a queen anymore *(changes her avatar's skin to a shirt and pants)*
Louise: I will kill Talia, hahahahaha! *(Text appears on Talia's screen from Louise: 'evil villeryerssay* (sic) *I will kill Talia, hahahahahaha')*

(Video Transcript, Home Visit 4, pp. 9–11)

Summary

Findings in relation to the first combinatorial activity, life experiences inspire imaginative thought, indicate children's imaginative thought is inspired in two significant ways during play as a leading activity in a digitally-mediated environment. Firstly, children's imaginative thought in a virtual world is inspired by real-world experiences (e.g., riding horses, watching movies) facilitated by adults in the societies in which they live (e.g., horse-riding instructors, parents). Secondly, children's imaginative thought in a virtual world is inspired by in-world virtual experiences (e.g., using symbolic objects, encountering in-world features of virtual environments) facilitated by adult designers of the gaming platform.

5.3.2 Products of imagination connect to reality in meaningful ways

The second combinatorial activity involves children connecting knowledge of real-life phenomena to products of imagination in meaningful ways. This means children use conceptual understandings acquired through social interactions in cultural settings to inform imaginary play situations. In this investigation, data indicated children connected understandings of natural science concepts, mathematical concepts, literacy concepts, and social science concepts in meaningful ways to products of imagination in a virtual world. Concept-related data in this section was informed by the Australian Curriculum (see Ch. 4, p. 86), specifically Science, Mathematics, English, and Humanities and Social Sciences (HASS) curriculum documents (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2018).

5.3.2.1 Natural science concepts

Data emerging from all play episodes suggested children connected real-life understandings of natural science concepts to products of imagination in a virtual world. In this research, *natural science concepts* refer to universal understandings about living things, properties of materials, the effects of force and sources of energy, and Earth's resources (ACARA: Science, 2018). The first natural science concept related to children's understandings about living things (ACARA: Science, 2018). In Play Episode 2: Horse-riding adventure, children packed food (e.g., bread, cake, milk) and a campfire in a *shulker box* (see Glossary) to take on a horse-riding adventure into an in-world forest suggesting they connected their knowledge of the basic needs of living things (e.g., food, warmth) to this imaginary play situation. Talia's real-world experience of going camping with her family may have informed this knowledge (Interview 1, Talia, p. 8). Upon embarking on this adventure, Louise said, "Let's try finding a village. We need somewhere to live!" (Video Transcript, Home Visit 2, p. 15) indicating she also connected a conceptual understanding that living things need shelter to a product of imagination.

The horse-riding adventure itself suggested children demonstrated knowledge that living things (i.e., horses) can be used for specific purposes (i.e., transport). Moreover, during the horse-riding adventure, when Talia was concerned her horse was moving too slowly, Louise reassured her by saying, "You're fast, there's just trees in the way. So, you can't run so fast in the trees" (Video Transcript, Home Visit 2, p. 19). This data suggested Louise connected her knowledge about how living things move to a product of imagination in a virtual world.

The second natural science concept related to children's understandings about the properties of different materials (ACARA: Science, 2018). In Play Episode 1: Shooting battle, Louise's avatar was invisible, so she put a block in its hand to reveal its location to Talia. This indicated Louise connected knowledge about the visible properties of objects to the imaginary play situation. Interview data offered further insight into this finding when Louise was asked if holding a block would work for Harry Potter whilst he was wearing his invisibility cloak:

> Jane: That's a very good idea, to hold the block and then Talia could see you.
> Louise: But not very well though.
> Jane: No. Does Harry do that in the movie? Does he hold something so they can see each other?
> Louise: No, then the block would have gone invisible, I think.
>
> (Interview 1, Louise, p. 3)

Interestingly, in Play Episode 5: Village exploration, data suggested this in-world play experience informed Talia's understandings of this concept when she turned her own avatar invisible to hide from Louise:

> Talia: Yes, I'm invisible!
> Louise: You know I can still see you.
> Talia: I need to have nothing in my hand. If I have nothing in my hand, then she probably won't find me.
>
> (Video Transcript, Home Visit 4, p. 8)

In Play Episode 3: New world exploration, data suggested Louise connected knowledge that certain materials have chemical properties by using TNT to explode rocks in a confined underground cave. Children also connected knowledge that materials are combined and used for specific purposes to imaginary play situations when Louise used stone blocks to build a room to hide her avatar in Play Episode 1: Shooting battle, and when both children used saddles to ride

horses, leads and fence posts to tie up horses, anvils and nametags to name pets, and a shulker box to carry supplies in Play Episode 2: Horse-riding adventure. In her first interview, Talia offered insight into her conceptual understandings of using materials for specific purposes. Firstly, she explained saddles are used in Minecraft so a horse can be ridden in the direction a user wants to go. Secondly, whilst viewing video playback, Talia noticed her avatar was using a magenta shulker box, prompting her to say, "I need to look for a dark blue instead of magenta, it's got no camouflage" (Interview 1, Talia, p. 10).

In Play Episode 5: Village exploration, Talia attempted to build a scarecrow using a carved pumpkin and hay. Interview data suggested Talia has real-life knowledge that scarecrows are used for specific purposes:

> Jane: Have you ever seen a real scarecrow?
> Talia: In an Indonesian book I have, there's a picture of a scarecrow.
> Jane: Is it standing in the middle of a corn field?
> Talia: Yeah, because they don't want the birds to eat their rice.
>
> (Interview 2, Talia, pp. 7–8)

Data from Play Episode 2: Horse-riding adventure, indicated Talia connected knowledge about the properties of clothing materials to products of imagination in a virtual world when she packed armour to protect her avatar, and changed her avatar's skin from what she referred to as a 'princess' dress to pants and a shirt just before her avatar embarked on the horse-riding adventure (see examples of these two skins in Figure 5.4).

Figure 5.4. Examples of the 'princess' skin (on left) and pants/shirt skin (on right).

In her first interview, Talia was asked why she packed armour for her avatar. “To keep myself safe,” she responded (Interview 1, Talia, p. 9). Talia was also asked during this interview why she changed her avatar’s skin from a princess dress to the same skin Louise’s avatar was wearing:

> Jane: So, you made them look exactly the same. Why did you want to do that?
> Talia: Because I thought a princess would look horrible for horse riding. I could rip the dress and it’s not really good camouflage for monsters . . . and it’s in the same section as Dad’s look on his computer. Cause he’s got Minecraft Edu on his computer. He’s got the same look as in the section that that skin is. He’s got red glasses.
> Jane: So, you wanted to look like Louise there and Dad as well, did you?
> Talia: Yeah.
>
> (Interview 1, Talia, p. 8)

While Talia was influenced to use an avatar skin similar to one used by her father and Louise, this data indicated she connected conceptual understandings about properties of clothing materials to the imaginary play situation by recognising that a pink dress offers little camouflage in a forest and could rip whilst riding a horse. Further data from Talia’s second interview revealed she often dresses up in princess dresses at her grandmother’s house (Interview 2, Talia, p. 5) suggesting real-world experiences informed her conceptual understandings about the properties of dress materials.

The third natural science concept involved children’s understandings about the effects of force and sources of energy (ACARA: Science, 2018). In all play episodes, children’s avatars used bows to shoot arrows and/or pickaxes to break up objects indicating they connected knowledge of the effects of force to products of imagination. In Play Episodes 1 (Shooting battle), 3 (New world exploration), and 4 (Underground mining), children connected real-life understandings of the effects of energy sources to products of imagination by using torches and/or lanterns to light up dark spaces. The fourth natural science concept related to children’s knowledge of Earth’s resources (ACARA: Science, 2018). In Play Episode 3: New world exploration, Louise connected her understandings of Earth’s resources to products of imagination by using water to extinguish fire, and identifying minerals, such as diamonds, lapis lazuli and gold, in the walls of an underground cave.

5.3.2.2 Mathematical concepts

In analysing play episodes, data emerged indicating children connected knowledge of mathematical concepts to products of imagination in a virtual world. In this research, *mathematical concepts* refer to universal understandings about location and three-dimensional objects (ACARA: Mathematics, 2018). With regard to the concept of location (ACARA: Mathematics, 2018), children used and interpreted directional language (e.g., under, behind, beside) to identify the location of their own and each other's avatars within in-world environments during all play episodes. In Play Episode 2: Horse-riding adventure, children connected knowledge of navigational tools to products of imagination by packing and using maps and compasses. This data was captured in two video transcript excerpts:

Excerpt 1:

> Louise: OK, let's go for a ride. Talia just wait! I need to get my map. Where's my map?
> Talia: I need to get my compass.
> Louise: Oh yeah, I need a compass.
> (*Talia's sister enters the research setting and asks Talia where her compass is*)
> Talia: My compass is right here, so if I get lost it'll always tell me which way to go.
> Louise: Yeah, it will be pointing to the rest points, so it will be pointing to where you'll walk.
>
> (Video Transcript, Home Visit 2, p. 14)

Excerpt 2:

> Louise: I don't know where I'm going!
> Talia: Yeah, because we're lost.
> Louise: We're not lost. We can point the way home with our compass.
>
> (Video Transcript, Home Visit 2, p. 16)

The second mathematical concept related to children's knowledge of three-dimensional objects (ACARA: Mathematics, 2018). In Play Episodes 3 (New world exploration) and 4 (Underground mining), children used obsidian cubes to build *Nether portals* (see Glossary and example in Figure 5.5) to transport their avatars to the *Nether* (see Glossary). This data indicated children connected knowledge about constructing three-dimensional objects to products of imagination in a virtual world.

Figure 5.5. An example of a Nether portal.

5.3.2.3 Literacy concepts

In all play episodes, data emerged suggesting children connected real-life knowledge of literacy concepts to products of imagination in a virtual world. In this research, *literacy concepts* refer to understandings about interpreting and creating visual, written, and digital texts (ACARA: English, 2018). Children interpreted visual and written texts (ACARA: English, 2018) by selecting symbolic objects they required for imaginary play situations (e.g., saddles, pickaxes) from their *inventory* (see Glossary). Interview data provided some insight into this finding when Louise was asked where she learnt the term 'lapis' after identifying this rock in underground tunnel walls during Play Episode 3: New world exploration. "When I learnt to read, I read out 'lapis' so now I know it," she explained (Interview 2, Louise, p. 3).

In Play Episode 2: Horse-riding adventure, Louise connected understandings of creating written texts (ACARA: English 2018) to products of imagination when she labelled her (and Talia's) horse and backpack. Then, in Play Episode 5: Village exploration, Louise composed two in-world text-chat messages whilst role-playing a queen (see Video Transcript data on p. 104). Interestingly, when Talia watched video playback of this imaginary play situation during her second interview, she admitted, "I did not see that there," referring to the first text-chat message sent by Louise (Interview 2, Talia, p. 9). Interview data indicated Louise connected knowledge of creating visual texts (ACARA: English, 2018) to products of imagination in a virtual world when she posed her avatar to take a selfie during Play Episode 3: New world exploration:

Jane: With the selfie, Louise, have you ever taken one in real life?
Louise: No. I took one in Minecraft. I'm always shifting when I take selfies and I'm always looking up too. (*She stands up to physically demonstrate this*)
Jane: Is that in real-life or when you're an avatar?
Louise: When I'm an avatar.

(Interview 2, Louise, p. 4)

In Play Episodes 4 (Underground mining) and 5 (Village exploration), Talia connected her knowledge of interpreting digital texts (ACARA: English, 2018) to products of imagination in a virtual world when she used the in-built search engine to locate symbolic items required for imaginary play situations (e.g., diamonds, paintings, potion of invisibility).

5.3.2.4 Social science concepts

In analysing play episodes, data emerged suggesting children connected knowledge of social science concepts to products of imagination in a virtual world. In this research, *social science concepts* refer to understandings about societal roles, sites of significance, and forms of government (ACARA: Humanities and Social Sciences [HASS], 2018). In Play Episode 2: Horse-riding adventure, Talia told Louise, "Right now I'm a doctor," when her avatar was dressed in a paramedic skin (Video Transcript, Home Visit 2, p. 2). Later in this play episode, Talia changed her avatar's skin to a pink dress saying, "Now I'm something else, I'm like a princess person" (Video Transcript, Home Visit 2, p. 8). In her first interview, Talia was asked if she ever pretended to be anything else in Minecraft. "I've been an explorer," she replied (Interview 1, Talia, p. 3). This data suggested Talia connects understandings of societal roles to products of imagination in a virtual world.

In Play Episode 5: Village exploration, children connected knowledge of sites of significance (ACARA: HASS, 2018) to products of imagination by identifying a Pillager outpost as a 'castle' (see Video Transcript data on p. 104). Children also connected conceptual understandings of forms of government (ACARA: HASS, 2018) to this imaginary play situation by wanting to be the single ruling monarch of the 'castle'. For Talia, knowing her favourite Disney character, Elsa, is

a single ruling monarch in the movie Frozen (Interview 1, Talia, p. 5) may have informed her understanding of this concept.

Summary

In relation to the second combinatorial activity, products of imagination connect to reality in meaningful ways, findings in this section indicate children make meaningful connections of real-life concepts (e.g., natural science, mathematics, literacy, and social science) to products of imagination in a virtual world. Children's conceptual understandings are acquired through social interactions in real-world cultural settings, such as homes (e.g., reading books, playing dress ups at Grandma's house) and schools (e.g., learning to read), and virtual world environments (e.g., taking a selfie, using bows and arrows).

5.3.3 Emotional connections are made to products of imagination

The link between imagination and affectivity represents the third combinatorial activity children use during sociodramatic play. This means children make emotional connections to products of imagination in similar ways as they would to actual real-life experiences. In this research, data from all play episodes suggested children connected emotionally to products of imagination in a virtual world through happiness, excitement, frustration, and worry. These four emotions were analysed according to data relating to children's verbal and/or non-verbal communication (e.g., gestures, facial expressions).

5.3.3.1 Happiness

In analysing play episodes, data emerged suggesting children made emotional connections to products of imagination in a virtual world through happiness. In this research, *happiness* is defined as an internal feeling of joy expressed verbally (e.g., saying "Yay!") and/or non-verbally (e.g., smiling, laughing). In Play Episode 1: Shooting battle, Louise smiled when she turned her avatar invisible to hide from Talia, saying, "You're not going to see me at all. Promise you!" (Video Transcript, Home Visit 1, p. 6). Talia was not familiar with this game feature so she asked Louise

how to turn her own avatar invisible. Louise obliged, and when Talia successfully turned her own avatar invisible, she said happily, “I’m invisible!” (Video Transcript, Home Visit 1, p. 6).

In Play Episode 5: Village exploration, Talia again expressed happiness when she turned her avatar invisible to escape arrow fire from Louise’s avatar. “Yes! I’m invisible!” Talia exclaimed happily (Video Transcript, Home Visit 4, p. 8). In Play Episode 2: Horse-riding adventure, data indicated children enjoyed watching each other’s avatars perform tricks on horses:

> Louise: It’s so cool what you just did! Do that again Talia, just jump up. Just jump up like this.
> Talia: Oh. Can I see you do it? Do it! Oh, that’s really cool! (*smiling*)
>
> (Video Transcript, Home Visit 2, p. 9)

In Play Episode 3: New world exploration, Louise used the *teleport* (see Glossary) feature to transport Talia’s avatar into lava to set it on fire. She laughed as she said, “See I made your avatar on fire!” (Video Transcript, Home Visit 3, p. 7). During Play Episode 4: Underground mining, Louise hung paintings on walls of an underground tunnel, intending to trick Talia into thinking they were already there. Data suggested both children enjoyed this play scenario:

> Louise: Talia, I found the weirdest thing. Look. Come over here Talia and see what it is. Look!
> Talia: A painting? Did you put that there? (*turns her avatar to look at Louise’s avatar*)
> Louise: Noooooo! (*in a funny voice*).
> Talia: Of course you did! (*smiling*). Yeah you put that there.
> Louise: Hehehehe (*cheeky laugh*). Paintings, paintings, paintings everywhere (*singing*).
>
> (Video Transcript, Home Visit 4, p. 4)

In Play Episode 5: Village exploration, Louise put a dragon’s head on her avatar and started shooting arrows at Talia’s avatar. “Talia, look I’m a dragon, roar! I’m a dragon with a bow and arrow! Hehehehe!” Louise said gleefully (Video Transcript, Home Visit 4, p. 7). Talia smiled and laughed when she saw Louise’s avatar dressed as a dragon. In Play Episode 1: Shooting battle, Louise enjoyed making her *agent* appear (see Glossary and example in Figure 5.6), which she called her ‘little helper’. Louise laughed as she told Talia, “Oh, my little helper’s under me, it’s floating!” (Video Transcript, Home Visit 1, p. 8). During her first interview, Louise laughed again

when she saw her agent whilst watching video playback. She explained how she liked getting her agent out because "they're cute" (Interview 1, Louise, p. 4). Talia also enjoys interacting with her agent. "I pretend my agent is a person because it's like a person," Talia stated in her first interview (Interview 1, Talia, p. 2).

Figure 5.6. An example of an agent.

In Play Episode 2: Horse-riding adventure, Talia smiled whilst telling her younger sister her avatar was wearing the same skin as Louise's avatar, laughing as she said, "I look exactly like her! We're twins!" (Video Transcript, Home Visit 2, p. 14). Later in this play episode, Talia smiled when the horse her avatar was riding jumped over obstacles, "Whee!" she said happily (Video Transcript, Home Visit 2, p. 15). Talia laughed again when her horse became stuck in bushland. In Play Episode 5: Village exploration, Louise used meat to *tame* (see Glossary) a dog roaming around the village. She named it 'Doggie' and enjoyed interacting with it by saying: "Yay Doggie, you're back!"; "Oh, you're hungry, are you?"; "Doggie . . . come over here sweetie!" (Video Transcript, Home Visit 4, p. 10). Talia also enjoyed interacting with 'Doggie', smiling and saying, "Oh he's so cute . . . it's a baby puppy!" (Video Transcript, Home Visit 4, p. 10). Data from these play episodes indicated children made happy connections to products of imagination in a virtual world through their interactions with each other and with *non-player characters* (see Glossary).

5.3.3.2 Excitement

Data from four play episodes indicated children connected to products of imagination in a virtual world through excitement. In this research, *excitement* is defined as an internal feeling of enthusiasm expressed verbally (e.g., exclamations) and/or non-verbally (e.g., open-mouth smile). In Play Episode 1: Shooting battle, Louise spawned several horses and was excited to see them moving around the in-world environment. “There’s horses everywhere!” she exclaimed. “Yay! Yay!” (Video Transcript, Home Visit 1, p. 9). In Play Episode 2: Horse-riding adventure, Talia and Louise were excited to embark on a horse-riding adventure. “Let’s go!” they both cried excitedly (Video Transcript, Home Visit 2, p. 15). During the horse-riding adventure, Louise also expressed her excitement by exclaiming, “Onward!” and “Charge!” (Video Transcript, Home Visit 2, pp. 18–19). In Play Episode 3: New world exploration, Louise was excited to tell Talia she had found lapis and gold whilst her avatar was exploring an underground tunnel, and a dolphin whilst her avatar was swimming underwater.

At the beginning of Play Episode 5: Village exploration, children were excited to locate a village in an unfamiliar world. “Talia, you did not guess what I just found! I found a village!” Louise exclaimed excitedly as her avatar flew over the village (Video Transcript, Home Visit 4, p. 5). Similarly, when Talia located the village, she expressed her excitement, “Found it! I found it, found it, found it!” (Video Transcript, Home Visit 4, p. 5). Talia also expressed excitement during this play episode when she saw a non-player character (NPC) wandering around the village. “Ooh, there’s a professor!” she said excitedly as she followed this character into its house (Video Transcript, Home Visit 4, p. 7). Louise, too, became excited when she found a dog wandering around the village, “Ooh, I found a doggie! I wanna tame it!” she exclaimed. “Woohoo, come here. Your name is Doggie now” (Video Transcript, Home Visit 4, p. 6). Later in this play episode, Talia wanted to find “the prettiest horse in the world” among a pack of horses she had spawned. “Ooooh! Yes, that one! This is the best horse!” she exclaimed when found the one she liked best (Video

Transcript, Home Visit 4, p. 9). Data from these play episodes suggested children connected emotionally to products of imagination in a virtual world through excitement as a result of their interactions with each other and non-player characters (NPCs), and when discovering interesting in-world phenomena.

5.3.3.3 Frustration

In analysing play episodes, data emerged indicating children connected emotionally to products of imagination in a virtual world through frustration. In this research, *frustration* is defined as an internal feeling of annoyance expressed verbally (e.g., saying "Hey!" or "Stop!" in an exasperated tone) and/or non-verbally (e.g., frowning, gesticulating). In Play Episode 1: Shooting battle, when Louise turned her avatar invisible and hid it from Talia, Talia asked her in an exasperated tone, "Why can't you just show yourself?" (Video Transcript, Home Visit 1, p. 7). Then, when Louise turned her avatar invisible again in Play Episode 3: New world exploration, Talia cried, "No!" indicating frustration at not being able to see Louise's avatar in the in-world environment (Video Transcript, Home Visit 3, p. 7). Data from Play Episode 4: Underground mining, suggested Talia also felt frustrated when Louise teleported her avatar into lava to set it on fire:

> Louise: I just teleported you so you're in the lava.
> Talia: I know (*frowning*).
> Louise: Are you still in the lava?
> Talia: No, I climbed up a little bit. Can we get out of here now?
>
> (Video Transcript, Home Visit 4, p. 1)

Talia was asked during her second interview how she felt when Louise transported her avatar into lava. "I mind," she responded, frowning (Interview 2, Talia, p. 1). In Play Episode 5: Village exploration, Talia frowned and said, "Hey!" when Louise teleported her avatar without her permission whilst they were exploring a village (Video Transcript, Home Visit 4, p. 6). In Play Episode 4: Underground mining, Louise expressed frustration when Talia accidentally broke blocks required for a Nether Portal. "Hey, Talia, stop!" she said (Video Transcript, Home Visit 4, p. 2).

Later in this play episode, Talia started mining diamonds Louise had placed in the walls of an underground tunnel. Louise became frustrated saying, “Please do not mine them. Stop Talia! You’re really annoying me!” (Video Transcript, Home Visit 4, p. 4).

During Play Episode 2: Horse-riding adventure, Talia frowned when she thought her avatar’s horse was moving too slowly, expressing her frustration verbally by saying, “Why is my horse going really slow?” and “Can I get a new horse?” (Video Transcript, Home Visit 2, pp. 18–19). Talia also exhibited frustration in Play Episode 5: Village exploration, when her avatar had difficulty mounting a horse. “C’mon ride! Why can’t I just ride you?” she said, frowning and swiping her finger forcefully across the screen. “It will never let me! That is the worst horse!” (Video Transcript, Home Visit 4, p. 11).

In Play Episode 3: New world exploration, Louise expressed frustration when she was unable to take an underwater selfie, “I can’t!” she said, frowning and tapping her screen forcefully. Louise also became frustrated in Play Episode 4: Underground mining, when she could not extinguish fire with water, saying in an exasperated tone, “Oh, why am I not allowed to do it?” Data from these play episodes suggested children connected emotionally to products of imagination in a virtual world through frustration as a result of interactions with each other and set limitations of the game design.

5.3.3.4 Worry

Data emerging from three play episodes indicated children connected emotionally to products of imagination in a virtual world through worry. In this research, *worry* is defined as an internal feeling of anxiety expressed verbally (e.g., saying “No!” or “Don’t!” in a fearful tone) and/or non-verbally (e.g., widened eyes). At the beginning of Play Episode 1: Shooting battle, when Louise heard Talia shooting arrows close to her avatar, she cried, “Don’t shoot it, Talia!” (Video Transcript, Home Visit 1, p. 5). Then, when the shooting battle began, Louise turned her avatar

invisible and built a small room for it to hide indicating she was worried about her avatar being shot by an arrow.

In Play Episode 2: Horse-riding adventure, video transcript data suggested Talia was worried about the safety of her avatar when she packed armour for an adventure into an unfamiliar forest:

> Talia: Hmm, milk, oh yeah, I need armour!
> Louise: No, we don't need armour.
> Talia: Well, I'm putting some on (*gestures her hand out with her palm flat*), just in case.
> Louise: We aren't going to the Nether.
> Talia: Well still, it could be dangerous (*places a full set of armour in her shulker box*).
>
> (Video Transcript, Home Visit 2, p. 13)

Later in this play episode, Louise wanted to change the game mode from *Creative* to *Survival* (see Glossary). Talia's reaction, "No! I don't want to!" (Video Transcript, Home Visit 2, Talia, p. 12) suggested she was worried about her avatar being exposed to hostile NPCs. Then, when children's avatars were riding horses through the forest, Talia frowned and said, "Oh!" when her horse almost rode into a river (Video Transcript, Home Visit 2, p. 15). She waited until Louise's avatar safely crossed the river on horseback before entering the river herself, indicating she worried about the safety of her avatar, and possibly her avatar's horse, during this imaginary play situation.

In Play Episode 5: Village exploration, children engaged in an imaginary feud whilst role-playing queens (see Video Transcript data on p. 104). Soon after this exchange, Talia quickly tried to mount a horse and, when she had difficulty doing so, asked me if she could play by herself. In her second interview, Talia explained she was trying to "ride away from Louise" (Interview 2, Talia, p. 10) suggesting she was worried about the safety of her avatar. Talia provided further insight into this finding when she admitted she prefers playing in indoor spaces in Minecraft. "Inside is safer, because there's like monsters outside," she explained (Interview 1, Talia, p. 2). These findings suggested children made emotional connections to products of imagination in a virtual world through worry as a result of perceived threats from other avatars and hostile NPCs.

Summary

Findings regarding the third combinatorial activity, emotional connections are made to products of imagination, suggest children make emotional connections to products of imagination in a virtual world. Data indicated children's interactions with each other generally evoke feelings of happiness and excitement, however, may cause frustration and worry. Interacting with non-player characters (NPCs) may evoke feelings of happiness and excitement in children, however, hostile NPCs may cause them to feel worried about the safety of their avatars. Exploring new worlds and discovering new phenomena may result in children feeling excited, however, limitations of the gaming platform might cause frustration.

5.3.4 Products of imaginative thought manifest in real ways

The fourth combinatorial activity involves children constructing external, visible products of imaginative thought to extend and enhance imaginary play situations. This means products of imaginative thought manifest in ways that are as real to children as the actual object the product represents within the context of the play. In this study, data emerged suggesting products of children's imaginative thought in a virtual world manifested in intangible ways within virtual world environments and tangible ways in real-world settings.

5.3.4.1 Intangible manifestations

Data from all play episodes indicated children constructed intangible manifestations of imaginative thought in a virtual world. In this research, *intangible manifestations* refer to immaterial symbolic objects used to extend and enhance imaginary play situations in a virtual world environment. In Play Episode 1: Shooting battle, Louise used blocks of smooth stone to build a small room to hide her avatar. In Play Episode 2: Horse-riding adventure, video transcript data captured how Louise created a 'backpack' using a shulker box (see example in Figure 5.7) for herself and Talia to take on their horse-riding adventure:

Louise: OK. I'm gonna make a backpack.
Talia: What? How do you make a backpack?
Louise: Oh, I'll show you what backpacks are.
Talia: Is it called a backpack or called something else?
Louise: It's called a shulker box and I change it into a backpack. I call it a backpack 'cause you can store things in it.

(Video Transcript, Home Visit 2, p. 8)

Figure 5.7. An example of a shulker box.

In Play Episode 3: New world exploration, children were exploring an underground tunnel when Louise said to Talia, "Wait, I have an idea. This won't work very well and it's not very safe but who cares!" Louise proceeded to place blocks of lava around the tunnel. "This lights us all up!" she said, "but it's just very dangerous" (Video Transcript, Home Visit 3, p. 2). Then, in Play Episode 4: Underground mining, children were unsuccessfully searching for diamonds in underground tunnel walls when Louise said, "I know how to find diamonds!" (Video Transcript, Home Visit 4, p. 4). Louise started placing diamonds from her inventory in the tunnel walls so she could mine them, prompting Talia to do the same. Soon after, Louise started hanging paintings on the tunnel walls so she could trick Talia (see Video Transcript data on p. 113), again prompting Talia to do the same. In Play Episode 5: Village exploration, Louise put a dragon's head on her avatar to surprise Talia, who was exploring a village. Data from these play episodes suggested products of children's imaginative thought in a virtual world manifested in intangible ways to extend and enhance imaginary play situations within virtual world environments.

5.3.4.2 Tangible manifestations

In analysing interview transcripts, data emerged indicating products of children's imaginative thought in a virtual world manifested in tangible ways. In this research, *tangible manifestations* refer to material symbolic objects used to extend and enhance imaginary play situations in real-world settings. In her second interview, Louise described how she often uses ideas from Minecraft during imaginary play situations with her toys. "It gives me ideas, like school, doctors, and things," she said (Interview 2, Louise, p. 6). Louise's mother, Michelle, believes Louise and her younger brother recreate what they see and experience within Minecraft in-world environments when they build 'worlds' together using tangible construction blocks (Parent Interview, Michelle, p. 6).

Similarly, Talia's father, John, thinks Talia may be drawing on Minecraft-related game design features to enhance imaginary play situations in real-world settings. "She has friends over or she's building something, pretending to do a shop or something, she's really good at having a label and instructions and maps and stuff like that," John explained (Parent Interview, John, p. 4). Data from these interviews indicated children produced tangible manifestations of imaginative thought in a virtual world to extend and enhance imaginary play situations in real-world settings.

Summary

Regarding the fourth combinatorial activity, products of imaginative thought manifest in real ways, data suggested products of children's imaginative thought in a virtual world manifested in real, intangible ways and in real, tangible ways. Such constructs manifested in real, intangible ways when children used immaterial symbolic objects (e.g., shulker boxes) to enhance and extend imaginary play situations in virtual world environments, and real, tangible ways when they used material objects (e.g., construction blocks) to enhance and extend imaginary play situations in real-world settings.

Conclusion

This chapter presented findings in relation to the research question:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

Findings emerging from this investigation addressed the research question by explaining how children in separate home settings engaged in the social situation of child development, *action in imaginary situations*, giving rise to play as a leading activity in a digitally-mediated environment. Factors influencing children's ability to engage in this online play practice in the home were also reported in alignment with the cultural-historical approach to childhood research guiding this study. It was established that children in this study used combinatorial activities described by Vygotsky (2004) to combine and rework aspects of reality with imagination to give rise to play as a leading activity in a digitally-mediated environment. Four key findings emerged from the research.

The first key finding suggested children's experiences in the real world and a virtual world inspired imaginative thought. These experiences were dependent on opportunities provided by adults in the societies in which they live, such as parents and virtual world game designers. The second key finding indicated products of children's imaginative thought in a virtual world connected to reality in meaningful ways. Children connected knowledge of real-life concepts (e.g., natural science, mathematics, literacy, and social sciences) acquired through social interactions in the real-world and a virtual world to products of imagination during sociodramatic play in a virtual world environment.

The third key finding proposed children made emotional connections (e.g., through happiness, excitement, frustration, and worry) to products of imagination in a virtual world. Such emotions were evoked through children's interactions with each other and/or non-player characters (NPCs), features of in-world environments, and/or as a result of game design limitations. The fourth key finding suggested products of children's imaginative thought in a virtual world manifested in real, intangible and tangible ways. Children constructed these products intangibly through

immaterial symbolic objects in virtual world environments, and tangibly through material symbolic objects in real-world settings. In the next chapter, reported findings will be used to describe the nature of online sociodramatic play and identify important factors facilitating children's ability to engage in this contemporary form of play in the home.

Chapter 6 Discussion

Introduction

This research examined how separately located children used networked digital technologies to engage in online sociodramatic play with each other. In this chapter, findings emerging from this study will be discussed in relation to the scholarly literature and the research question:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

A richly detailed description of the defining features and fundamental characteristics of this contemporary form of play will be presented. In accordance with the cultural-historical approach to childhood research guiding this study, important factors influencing children's ability to participate in the social activity under investigation will be recognised and considered.

6.1 Defining features of play as a leading activity in a digitally-mediated environment

The cultural-historical theoretical concept of *play as a leading activity* is defined according to two essential, interrelated features. First, for play to be considered a leading activity, it must involve the creation of imaginary situations (Leontyev, 2009). Second, play involving the creation of imaginary situations leads development of preschool and early school age children's central psychological functions (Vygotsky, 1978). Current understandings of the defining features of play as a leading activity are based on children interacting with each other in the same physical space. Information in this section will provide insight into the defining features of play as a leading activity when separately located children engage in this form of play in a digitally-mediated environment.

6.1.1 Creating imaginary situations

Fundamentally, play as a leading activity involves children voluntarily and willingly creating role-based and rule-bound imaginary situations using symbolic actions, objects, and language (El'Konin, 2005a). It is important to reiterate that the rule-bound nature of this form of play differs from rules-based games. During play as a leading activity, children adhere to rules

dictated by the imaginary play situations they create. This means adopted roles are subject to set behavioural rules that represent a unity between the physical content (role) and social content (rules) of imaginary play situations (Leontyev, 2009). For example, children role-playing queens must speak and act like queens. In rules-based games, however, children adhere to set operational conditions of the game and are thus prevented from creating imaginary situations. For example, an archery challenge requires children to hit a bullseye with an arrow.

Reported findings in this investigation indicated separately located child participants, Talia and Louise, engaged in play as a leading activity using networked digital technologies by role-playing as avatars in the same virtual world environment whilst synchronously using video communication tools to discuss their play. Prior to participating in this research, these two children, who are friends in the real world, voluntarily and willingly engaged in this form of play by independently initiating their online play experiences without adult intervention. Children's voluntary willingness to use networked digital technologies for interactive online play opportunities reflects claims that online spaces have become contemporary forms of 'backyards' (Dezuanni, 2018) and 'playgrounds' (Burke, 2013; Lane & Yi, 2017; Sarachan, 2013) for the current generation of children. While important factors at home and school facilitated access to this contemporary form of play, children were not instructed by parents or teachers to use networked digital technologies to engage in online play with each other.

Reported findings indicated Talia and Louise used specific software platforms synchronously to create role-based and rule-bound imaginary play situations using symbolic actions, objects, and language whilst physically situated in separate home settings. In this research, these imaginary play situations were referred to as *play episodes* recognised when children engaged in sociodramatic play with each other. In Play Episode 1: Shooting battle, children adopted roles as warring archers. They adhered to rules of play by shooting arrows at each other and trying to escape arrow fire. Symbolic actions (e.g., firing arrows), objects (e.g., bows, arrows), and language (e.g.,

I'm trying to shoot you!) were used during this imaginary play situation. The horse-riding adventure in Play Episode 2 saw children adopting roles as adventurers. They abided by rules of play as they packed supplies then embarked on an adventure into a forest whilst riding horses. Children used symbolic actions (e.g., riding horses), objects (e.g., horses), and language (e.g., Let's go!) during this imaginary play situation.

In Play Episode 3: New world exploration, children role-played explorers. The rules of play were followed as they explored underground and above-ground in-world spaces. Children used symbolic actions (e.g., lighting up dark spaces), objects (e.g., lava), and language (e.g., This lights us all up!) during this play episode. Children adopted roles as miners in Play Episode 4: Underground mining, adhering to rules of play by searching underground tunnels for diamonds. They used symbolic actions (e.g., mining diamonds), objects (e.g., pickaxes), and language (e.g., I know how to find diamonds!) during this imaginary play situation. In Play Episode 5: Village exploration, children again role-played explorers, abiding by rules of play to explore an unfamiliar village. Symbolic actions (e.g., feeding a dog), objects (e.g., dog), and language (e.g., Doggie, come over here sweetie!) were used by children during this play episode.

Descriptions of five play episodes identified in this research indicated children's ability to role-play as avatars in the same virtual world environment via video chat served as a suitable platform for separately located children to create imaginary situations, a defining feature of play as a leading activity. In Figure 6.1, reported data from Play Episode 2: Horse-riding adventure, represents an example of how children in this research created an imaginary situation in a digitally-mediated environment.

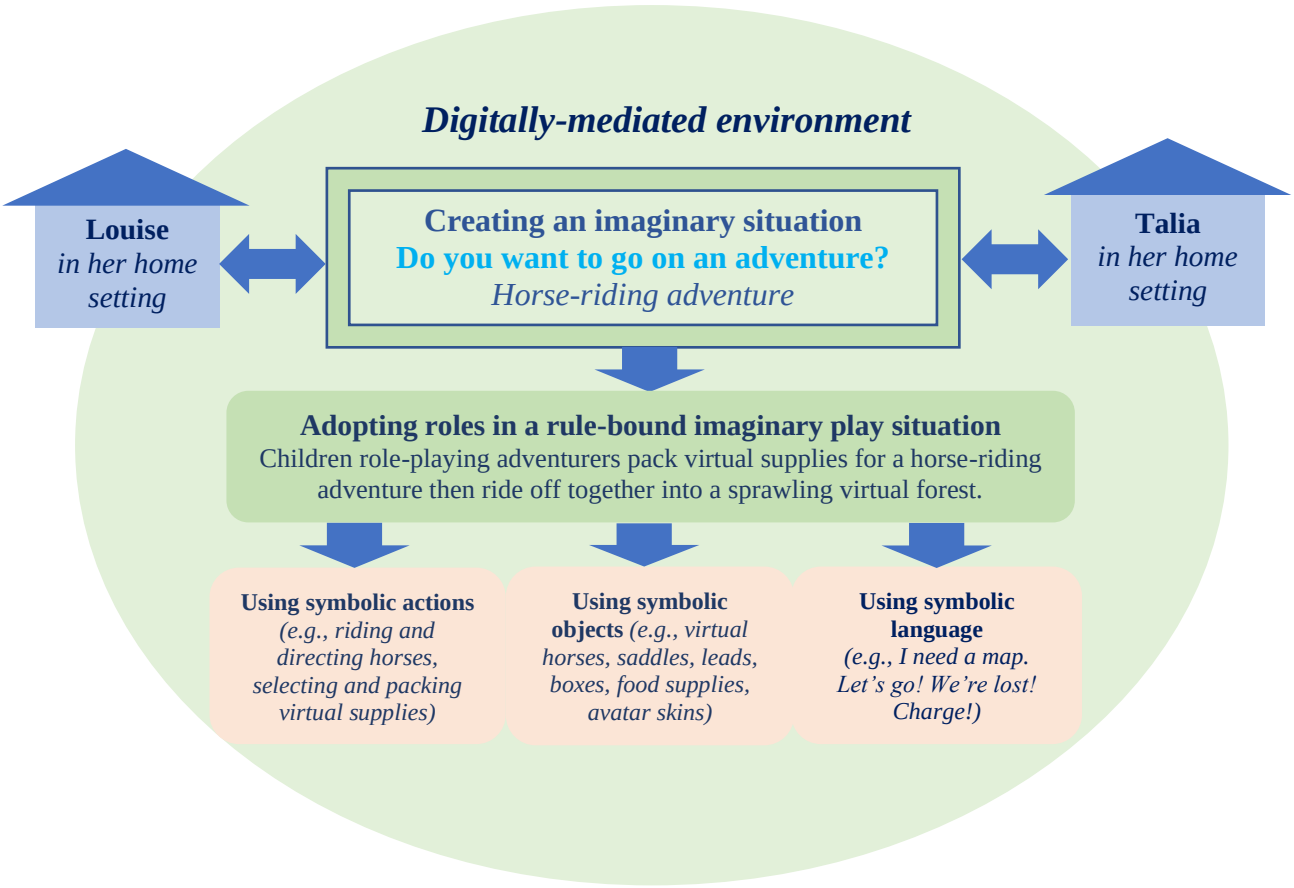

Figure 6.1. Creating an imaginary situation in a digitally-mediated environment.

Data represented in Figure 6.1 builds on findings from existing studies indicating virtual world gameplay supports imaginary forms of play (Lane & Yi, 2017; Singer & Singer, 2005) and provides opportunities for children to re-enact real-life experiences (Burke, 2013; Dezuanni, 2018; Sarachan, 2013), adopt adult roles to interact and communicate with other users (Black & Reich, 2012; Dezuanni et al., 2015; Lane & Yi, 2017), and use symbolic actions (Marsh, 2011). Moreover, this data contributes to a clearer understanding of assertions by Lane and Yi (2017) that imaginary play situations in Minecraft address key aspects of the cultural-historical view of play. These include satisfying children's unrealised needs (e.g., owning a pet horse) and facilitating children's motives for play (e.g., riding a horse), inclinations to act (e.g., going on an adventure), and incentives to act (e.g., packing supplies to take on a horse-riding adventure).

6.1.1.1 Adopting roles

Children's adoption of roles is central to the concept of play as a leading activity (Bodrova & Leong, 2007; El'Konin, 1999). In this research, children adopted several roles, such as adventurers, explorers, and miners, through their embodiment as avatars in various virtual world environments. At times, children's role adoption was fluid and transient as they adapted to evolving and unfolding imaginary play situations. Consequently, roles were not always easily identifiable, reflecting the nature of school age children's sociodramatic play (Kravtsov & Kravtsova, 2010). For example, at the beginning of Play Episode 2: Horse-riding adventure, Talia told Louise she was a 'doctor' whilst her avatar was wearing a paramedic skin. Soon after, Talia changed her avatar's skin to a pink dress, and referred to herself as a 'princess'. Talia's avatar, however, did not visibly act or interact with Louise's avatar in ways reflective of doctors or princesses and, subsequently, Louise's avatar did not adopt complementary roles, such as a nurse or a queen. Later in this play episode, however, Talia changed her avatar's skin to pants and a shirt whilst role-playing an adventurer. In this situation, Talia's change of skin was prompted by her interactions with Louise as they prepared to embark on a horse-riding adventure.

This example reflects the cultural-historical view that children do not base imaginary play situations on symbolic objects alone, but on the reproduction of human actions and interactions (El'Konin, 2005a). When Talia used symbolic objects (i.e., avatar skins) to adopt roles as a doctor and princess, but then did not act or interact in ways reflective of these roles, imaginary play situations with Louise did not evolve. Conversely, however, when Talia acted and interacted with Louise as an adventurer, she used a symbolic object, an avatar skin, to suit the evolving imaginary play situation. Further data supporting this assertion emerged at the beginning of Play Episode 1: Shooting battle, when Louise was inspired to start shooting arrows at Talia's avatar after seeing it was holding a bow and arrow. Here, the symbolic object alone did not form the basis of this play

scenario, it was the children's actions and interactions (i.e., shooting arrows at each other, hiding from each other) that determined the nature of the imaginary play situation.

Other examples of the fluid and transient nature of children's adoption of roles in a virtual world occurred during the final two play episodes. In Play Episode 4: Underground mining, children role-played miners whilst digging for diamonds, then briefly adopted roles as interior decorators by hanging paintings on underground tunnel walls. Shortly after this, children's avatars dug their way to an above-ground world, where they adopted roles as explorers giving rise to Play Episode 5: Village exploration. Whilst roaming the village as explorers, Louise briefly and unexpectedly adopted a dragon role, adhering to rules of play by behaving like a fierce dragon roaming the village. She used symbolic objects (dragon's head, bow and arrow), actions (shooting arrows at Talia's avatar), and language (e.g., Talia, look I'm a dragon, roar! I'm a dragon with a bow and arrow!) during this imaginary scenario. This example confirms Leontyev's (2009) view that children exhibit human-like characteristics and social functionality (e.g., speaking, shooting arrows) when they adopt non-human roles (e.g., a dragon) during imaginary play situations.

Later in Play Episode 5: Village exploration, an in-world structure prompted children to adopt roles as queens (see Video Transcript data in Ch. 5, p. 104). They adhered to behavioural rules of play by speaking, acting, and interacting like queens and used symbolic objects (e.g., a 'castle', queen skins), actions (e.g., standing at the top of the 'castle'), and language (e.g., I'm queen and this is my castle!) during this imaginary scenario. Data from these play episodes builds on existing findings suggesting embodied virtual identities children adopt are based on shared narratives between play partners (Burke, 2013) and children, particularly girls (Beavis et al., 2015), value their avatar's appearance during interactive virtual world gameplay (Marsh, 2011).

Role-play related data in this research provides insight into the nature of interactions between children during sociodramatic play. El'Konin (2005a) posits such interactions may range from helping and/or collaborating with others, to showing hostility and/or "wielding power, even

despotism" (p. 45). Reported data indicated children in this investigation role-played explorers helping each other (e.g., by lighting up underground spaces to better facilitate joint exploration), adventurers collaborating with each other (e.g., by exchanging ideas about suitable items to pack for a horse-riding adventure), warring archers showing hostility (e.g., by engaging in a shooting battle), and despotic queens (e.g., by declaring absolute power over a castle). These examples also reflect current understandings that school age children adhere to explicit behavioural rules dictated by the roles they adopt during imaginary play situations (Bodrova & Leong, 2007).

6.1.1.2 Achieving intersubjectivity

For sociodramatic play to be successful, it is imperative for play partners to achieve intersubjectivity: a shared understanding of the imaginary nature of play. Intersubjectivity is achieved when children playing together maintain a joint focus of attention, use symbolic actions and language, and exchange meta-communication strategies (e.g., co-ordinating, discussing, manipulating, and negotiating aspects of play) during imaginary play situations (Göncü, 1993).

Reported data from the five play episodes in this research indicated children successfully achieved intersubjectivity during online sociodramatic play. First, children maintained a joint focus of attention by interacting as avatars in the same in-world environments during all play episodes, building on existing findings suggesting children experience shared realities (Merchant, 2009) and focused interactions (Marsh, 2011) during interactive play in a virtual world. Second, children used symbolic actions and language during all play episodes (see example in Figure 6.1) confirming studies indicating children use symbolic actions and language during virtual world gameplay (Burke, 2013; Marsh, 2011; Reich et al., 2014; Sarachan, 2013). Third, children used varied, concentrated, and sophisticated verbal meta-communication strategies to engage in multi-dimensional imaginary play situations, reflecting current understandings about the nature of school-age children's sociodramatic play (Johnson, 2006; Kravtsov & Kravtsova, 2010). These strategies included co-ordinating play scripts (e.g., packing supplies simultaneously then embarking on a

horse-riding adventure together), discussing play scripts (e.g., exchanging ideas about items to pack), manipulating play scripts (e.g., using a box as a 'backpack'), and negotiating play scripts (e.g., deciding where to go and what to do on a horse-riding adventure).

Interestingly, while reported findings indicated child participants displayed non-verbal communicative behaviours (e.g., facial expressions, gesticulating) when connecting emotionally to products of imagination in a virtual world, they rarely made eye contact with each other through the FaceTime screen, suggesting exchange of non-verbal meta-communication strategies was negligible. Current understandings about children engaging in sociodramatic play in the same physical space assert that play partners use non-verbal meta-communicative strategies (e.g., meaningful gestures, facial expressions) to support verbal negotiations (Monighan Nourot, 2006). Lack of eye contact between children in this research, however, indicated they did not employ non-verbal meta-communicative strategies to support verbal negotiations during online sociodramatic play. Reported data and existing studies illuminate insight into two possible reasons for this.

The first reason proposes children prioritised their embodiment as avatars over their authentic selves during online sociodramatic play thus considered exchanging non-verbal meta-communicative strategies through the FaceTime screen purposeless and ineffectual. For example, during Home Visit 2, Talia's younger sister asked Talia, "Where is Louise?" In response, Talia did not point to Louise's face in the FaceTime screen, rather, she pointed to Louise's avatar in the in-world virtual environment. In another example, during Play Episode 4: Underground mining, Talia turned her avatar to face Louise's avatar when asking Louise if she placed paintings on the cave walls (see Video Transcript data in Ch. 5, p. 113). These examples also suggest children's complete embodiment as avatars rendered the requirement for avatar pseudonyms on the child assent forms unnecessary and may inform ethical considerations for future studies exploring young children's use of virtual worlds.

A second possible reason non-verbal meta-communication strategies were not exchanged by children in this research draws on findings from studies into the use of video communication tools by separately located children. While children in separate locations have been found to exchange non-verbal communication strategies (e.g., gestures, facial expressions) during conversations via video chat (Austin et al., 2017), verbal conversational discourse is markedly different to the verbal communicative discourse children use during sociodramatic play. For sociodramatic play to be successful, children must intentionally communicate with each other to maintain a shared understanding of the imaginary nature of evolving play situations. In a virtual world, this meaningful exchange requires children to pay attention to actions and interactions of their own and other avatars within in-world virtual environments. For 7- to 8-year-old children, paying attention to multiple points of focus in a virtual world whilst simultaneously exchanging non-verbal meta-communication strategies with a separately located peer through a FaceTime screen may be psychologically difficult.

This assertion reflects findings from Yarosh et al. (2010) who suggest separately located 7- to 8-year-old children engaging in social play via video chat have limited "attention resources available" (p. 8) due to the inherently cognitively challenging nature of social forms of play. For Talia and Louise, however, the absence of non-verbal meta-communication strategies did not seem to affect their ability to achieve intersubjectivity during play episodes. This assertion is supported by data suggesting children in this study continued to successfully engage in sociodramatic play when technical difficulties obscured the FaceTime screen during online play sessions.

6.1.2 Leading cognitive development

According to cultural-historical theory, sociodramatic play is the most important activity contributing to development of preschool and early school age children's central psychological function of memory (Vygotsky, 1978). In alignment with this theoretical perspective, findings in this study suggest development of memory is a significant cognitive benefit for children in separate

home settings engaging in online sociodramatic play with each other through networked digital technologies. Moreover, reported findings indicate children engaging in sociodramatic play in the same online space reaped cognitive benefits similar to those afforded to co-located children engaging in sociodramatic play in the same physical space. Such benefits include development of four specific cognitive processes described by El'Konin (2005b): intentional behaviours, reflective thinking, abstract thought, and more sophisticated intentional behaviours.

First, children in this study demonstrated intentional behaviours to achieve long term goals by acting deliberately according to the rule-bound and role-based nature of imaginary play situations. For example, in Play Episode 2: Horse-riding adventure, Louise and Talia delayed embarking on the horse-riding adventure to pack supplies to take with them on their journey. Second, child participants displayed reflective thinking by viewing online play experiences from multiple perspectives according to real and imaginary aspects. For example, in Play Episode 5: Village exploration, Louise, in role as a queen, told Talia she built the castle, then, soon after, as her authentic self, Louise admitted she didn't actually build it. This example builds on existing research suggesting children skilfully co-ordinate multiple perspectives based on real and virtual embodied identities during virtual world gameplay (Burke, 2013; Burnett & Merchant, 2014). Karpov (2005) argues children's ability to co-ordinate multiple perspectives supports "successful learning" (p. 168) at school. This is because, in a school setting, children are expected to co-ordinate their actions with others (e.g., classmates) and acquire knowledge drawn from others' perspectives (e.g., scientific laws and rules) taught by teachers.

The third cognitively beneficial process afforded to children engaging in online sociodramatic play is development of abstract thinking. Reported data suggests children in this study transformed concrete thinking (e.g., a shulker box can only be a shulker box; a Pillager outpost can only be a Pillager outpost) to abstract thinking (e.g., a shulker box can be a 'backpack'; a Pillager outpost can be a 'castle') when they assigned new meanings to symbolic objects. These

examples demonstrate children's awareness of the boundaries of *substitution* (see Ch. 3, p. 56) in recognising that properties of symbolic objects should suitably reflect those of imagined objects in order for them to be assigned new symbolic meanings. For Louise and Talia, a shulker box could suitably represent a 'backpack' and a Pillager outpost could suitably represent a 'castle' as these objects share similar properties. Children also assigned new meanings to their actions during imaginary play situations. For example, the action of riding a horse had multiple meanings in play, such as taking avatars on adventures and removing avatars from danger. Fourth, children in this investigation used sophisticated intentional behaviours by communicating to each other using play-related language that adhered to rules dictated by imaginary play situations. For example, in Play Episode 2: Horse-riding adventure, children used play-related language to plan, discuss, co-ordinate, and negotiate an imaginary horse-riding adventure into a virtual forest.

6.1.2.1 Awakening the zone of proximal development

The zone of proximal development (ZPD) is a cultural-historical concept representing the bridge between things children can do or understand by themselves to what they are capable of doing or understanding during sociodramatic play or through collaboration with more knowledgeable others (see Ch. 3, pp. 59–60). Recognising sociodramatic play as awakening the ZPD in children is important as this aspect is often neglected when scholarly references describe how the ZPD is defined and applied (Bodrova, Germeroth, & Leong, 2013). For example, entries in the Encyclopedia of Child Behaviour and Development (Silverman, 2011) and the Encyclopedia of the Sciences of Learning (Podolskiy, 2012) refer to the collaboration with more knowledgeable others (e.g., experts, parents, advanced peers) aspect of the ZPD, but omit references to the role of sociodramatic play within this concept.

Reported findings in this research suggest play as a leading activity in a digitally-mediated environment awakens the ZPD for separately located children through sociodramatic play *and* by collaborating with more knowledgeable others. Firstly, reported data indicates sociodramatic play

episodes motivated child participants to adapt their usual levels of behaviour to adhere to rules of play and meet the needs of a play partner. Children also co-constructed imaginary play situations according to previous life experiences to extend and enhance play scenarios. With regard to adapting behaviour to adhere to rules of play, in Play Episode 5: Village exploration, Talia claimed herself 'queen of the castle' demonstrating an assertive confidence rarely displayed during other in-world play situations, such as when Louise teleported her avatar without permission on multiple occasions. Louise, too, adapted her behaviour to adhere to rules of play by risking danger when she lit up an underground tunnel with lava to facilitate the imaginary situation during Play Episode 3: New world exploration.

In adapting usual levels of behaviour to meet the needs of play partners, Talia overrode her preference for playing in 'safe' indoor virtual environments by navigating unpredictable, outdoor virtual environments to meet Louise's preference for playing in outdoor spaces. Louise, too, adapted her behaviour to meet Talia's needs when she briefly paused play to show Talia how turn her avatar invisible in Play Episode 1: Shooting Battle. Louise also continued to play in *Creative mode* (see Glossary) despite wanting to change to *Survival mode* (see Glossary) during Play Episode 2: Horse-riding adventure, after Talia resisted this change. With regard to co-constructing imaginary play situations according to previous life experiences, Louise, an experienced horse-rider in the real world, initiated the horse-riding adventure in Play Episode 2, while Talia, a fan of Queen Elsa from the movie *Frozen*® and a regular player of 'queens and princesses' in the real world, claimed herself queen of Louise's castle in Play Episode 5: Village exploration which extended and enhanced this play scenario.

Secondly, reported data in this research indicates engagement in online sociodramatic play awakens the ZPD in children by enabling them to acquire conceptual understandings and skills through interacting with more knowledgeable others, such as advanced peers and adult game designers. With regard to advanced peers, in Play Episode 1: Shooting battle, Louise showed Talia

how to turn her avatar invisible, a skill Talia later used independently during Play Episode 5: Village exploration to remove her avatar from a perceived threat in play. This assertion builds on findings from a recent study suggesting interactive virtual world gameplay offers children the "opportunity to learn from peers" (Dezuanni, 2018, p. 246). Moreover, research context data reported Louise taught her younger brother how to spawn creatures in Minecraft and, during Play Episode 2: Horse-riding adventure, Talia and Louise explained to Talia's younger sister what a Minecraft compass was used for (see Video Transcript Excerpt 1 in Ch. 5, p. 109). This data builds on existing findings indicating older children mentor younger siblings with using digital gaming platforms (Kervin et al., 2018), including virtual worlds (Danby, Evaldsson et al., 2018).

With regard to adult game designers awakening the ZPD for children in this research, interview data suggests Louise's interactions with the Minecraft gaming platform may have informed her acquisition of real-life concepts such as *lapis* and *selfie* during Play Episode 3: New world exploration. Moreover, during imaginary play situations, Talia and Louise built *Nether portals* (see Glossary) according to criteria set by the game's designers. These examples reflect claims that in-world digital environments play a role as the "expert or more capable other that supports young players' learning experiences within online spaces" (Black & Reich, 2012, p. 29) and are essentially worlds that are co-constructed by players and game designers (Hafner, 2015; Mustola et al., 2018).

6.1.2.2 Advancing toward a mastery of play

From a cultural-historical theoretical perspective, children master play as a leading activity when they voluntarily and independently describe their actions verbally whilst reflecting on imaginary play situations with adults. Reported interview data indicated children in this research voluntarily and independently reflected on their actions within imaginary play situations by describing them in a social context during interviews to an adult researcher. For example, in her first interview, Talia voluntarily reflected on her choice of colour for her shulker box whilst

responding to an unrelated question. Louise, too, voluntarily reflected on the way she posed her avatar to take selfies in Minecraft whilst responding to a question about real-world experiences of selfies. These examples suggest child participants have become aware of their motivations during imaginary play situations in a virtual world, consequently advancing them toward a mastery of play. This indicates play as a leading activity in a digitally-mediated environment potentially supports children's ability to assign meaning to their actions, fostering development of the psychological function of *attention*. Paying attention to common social activities in cultural settings is crucial for children to be psychologically capable of learning in formal educational settings.

Summary

In this section, defining features of play as a leading activity in a digitally-mediated environment were described and explained. The first defining feature focused on how separately located children created imaginary situations when they engaged as avatars in the same virtual world environment using video communication tools to discuss their play. The second defining feature considered the potential for play as a leading activity in a digitally-mediated environment to support cognitive developmental outcomes for separately located children.

6.2 Characteristics of play as a leading activity in a digitally-mediated environment

Reported data suggests separately located children in this research used unique, complex combinatorial activities to rework and combine elements drawn from reality with imagination to use and interact with immaterial, symbolic aspects of in-world virtual environments. Four key findings emerged describing combinatorial activities children used during play as a leading activity in a digitally-mediated environment and these represent the fundamental characteristics of this contemporary form of play. The key findings are: 1) Life experiences in the real world and a virtual world inspire imaginative thought; 2) Products of imagination in a virtual world connect to reality in meaningful ways; 3) Emotional connections are made to products of imagination in a virtual world; and 4) Products of imaginative thought in a virtual world manifest in intangible and tangible ways.

6.2.1 Life experiences in the real world and a virtual world inspire imaginative thought

The first proposed characteristic of play as a leading activity in a digitally-mediated environment sees children drawing on real-world life experiences (e.g., riding horses) and virtual world life experiences (e.g., access to a virtual forest) to inspire imaginative thought. These experiences provide rich materials for children to combine and rework in imaginative ways to create and enact imaginary situations during online sociodramatic play. For example, riding horses in the real-world, and access to a sprawling forest in a virtual world, inspired children to embark on a horse-riding adventure.

While adult designers of virtual world software platforms largely determine the environmental surrounds and symbolic objects available within a particular game, data in this investigation indicated children reworked and combined these elements in their own unique way to inspire imaginative thought. For example, using a deep-sea environment to take an underwater selfie or placing diamonds in an underground tunnel when they cannot be located. In Karpov's (2005) view, "adult mediation is the major determinant of children's sociodramatic play" (p. 150), and in a virtual world, adult game designers mediate children's ability to create imaginary situations. They do this by offering children opportunities to adopt real-life roles they may know little about (e.g., explorers or miners) and exposing them to in-world environments they may be unable to access in the real world (e.g., ocean floor or underground tunnel). This finding is particularly noteworthy for children from low-income families as research suggests they are disadvantaged in terms of adult-mediated sociodramatic play opportunities (see Karpov, 2005).

These claims highlight the importance of recognising virtual world game design features that serve to inspire, not hinder, children's imaginative thought. In-world virtual environments are essentially controlled by adult creators who determine the game's architectural design, rules of play, mechanics, and features (Mustola et al., 2018). Nardi (2010) argues the nature of virtual world game designs have a powerful effect on how players experience a particular game. Several studies

offer insight into virtual world game design features that potentially hinder opportunities for in-world experiences to inspire children's imaginative thought. For example, subscription-based game designs limit access to social experiences and symbolic objects for children lacking economic capital (Kargin, 2018; Marsh, 2011) and some game designs position users to adopt specific roles (Hafner, 2015). Moreover, research suggests designs embedded with consumerist principles impact children's creativity and decision-making during gameplay (Burke, 2013) and motivate children to engage in rules-based games (Sarachan, 2013).

For a virtual world such as Minecraft, however, the flexible, open-ended nature of the game design means it is "capable of supporting incredibly complex interactions and experiences" (Lane & Yi, 2017, p. 149), as reflected in the findings of this research. Interestingly, Kuhn (2018) explains the original designers of Minecraft, Mojang®, intentionally created minimalist in-world features "to keep the game's focus on gameplay rather than graphical richness" (p. 216). Sarachan (2013) suggests more experimental, flexible virtual world game designs, such as Minecraft, "might increase the ability to develop new mental schema" (p. 254) as children are able to control their decisions and actions within in-world environments according to their interests and motivations.

Findings in this research indicate the flexible, open-ended nature of the Minecraft game design served as an effective platform for children to draw on in-world virtual experiences to inspire imaginative thought (e.g., a graphical bow and arrow inspired a shooting battle). When considering how game designs provide in-world experiences that foster children's imaginative thought, however, it is important to recognise not all 'worlds' within virtual world gaming platforms are created by game designers. For example, most virtual world software platforms for children (e.g., Minecraft, Roblox) offer players the opportunity to create *user-generated content* by reconfiguring in-world spaces that other users can access. Such designs potentially limit opportunities for children to draw on in-world experiences to inspire imaginative thought, particularly those involving rules-based games or delivering specific subject content. As Singer and

Singer (2005) argue, it is not technology itself that inhibits children's imagination, it is the content that truly matters. In virtual world environments, the way children use game design features to inspire imaginative thought is what truly matters to the creation of imaginary play situations.

According to Vygotsky (2004), a broader range of life experiences leads to a more productive, richer imagination as children rework elements of life experiences in new and creative ways. Such elements might be drawn from real-life activities (e.g., a bow shoots arrows), and/or products of fantasy (e.g., wizards can become invisible), and combined by children's psychological processing in innovative ways they have not actually encountered (e.g., turning an avatar invisible to escape arrow fire). While real-world elements are firmly based in reality, fantastical elements derive from impressions made on the child through aspects of popular culture, such as books, films, or, as suggested in this research, virtual worlds.

Consequently, children who encounter a wide variety of experiences in the real world and a virtual world have access to a broader range of real and fantastical elements to rework into more complex combinations during imaginary play situations. This assertion builds on current understandings about the capacity for aspects of popular culture to support development of imagination in children. For example, material toys representing popular children's television characters can foster imagination when children ascribe personal meanings to such toys and reinterpret them in culturally significant ways (Edwards, 2011; Singer & Singer, 2005).

Just as children selectively reinterpret aspects of popular culture during imaginary play situations, this key finding indicates in-world virtual experiences may be used in similar ways to inspire imaginative thought. Further research could provide insight into the potential for in-world virtual experiences to foster development of imagination in children who face barriers in accessing a wide variety of real-world experiences, such as those from low-income families, with serious medical conditions, or physical and/or intellectual disabilities. Currently, several studies have examined how digital technologies might be used in ways that support literacy skills in children at

risk (see Shamir & Korat, 2013), however, few studies explore how virtual world experiences might provide vulnerable children with increased access to rich materials that inspire imaginative thought.

6.2.2 Products of imagination in a virtual world connect to reality in meaningful ways

In cultural-historical theory, connecting knowledge acquired through social interactions in cultural settings is essential for establishing meaning during imaginary play situations. Findings in this research suggest the second characteristic of play as a leading activity in a digitally-mediated environment is that children make complex, meaningful associations between real-life conceptual understandings and products of imagination in a virtual world. For example, a child connects knowledge about the properties of clothing materials acquired through playing dress ups with relatives at Grandma's house to select a suitable skin for an avatar to wear on a horse-riding adventure in a virtual world.

An embedded component of this characteristic indicates children acquire knowledge of real-life phenomena through social interactions with other users and/or adult game designers in a contemporary cultural setting, a virtual world environment, then connect this knowledge to products of imagination during online sociodramatic play. For example, a child connects knowledge about the properties of chemical materials acquired through interactions with a virtual world software platform to use TNT to explode rocks in a confined underground virtual space.

Findings relating to this characteristic also suggest children's knowledge of real-life phenomena acquired through virtual world experiences and real-world experiences may, at times, interrelate. For example, in the real world, children learn saddles are used to ride horses and, in Minecraft, they learn saddles are required to direct horses, then connect this knowledge to use saddles to ride virtual horses successfully. Here, children's conceptual understanding that saddles are used for specific purposes is informed by adults in the real-world (e.g., horse-riding instructors) and adult game designers of Minecraft.

This assertion builds on findings from several studies suggesting children acquire knowledge of real-life phenomena during virtual world gameplay. These include science and mathematical concepts (Hobbs, Stevens, Hartley, & Hartley, 2019; Lane & Yi, 2017), social science concepts (Lane & Yi, 2017), and literacy concepts (Black, 2010; Black & Reich, 2012; Marsh, 2011; Merchant, 2009). Such concepts, however, are wholly dependent on embedded features of the virtual world game design. For example, the Minecraft game design is heavily saturated in natural science-based concepts (Hobbs et al., 2019), whereas the game design of Webkinz World is embedded with a wide range of literacy-based concepts (e.g., interpreting instructional text types) immersing users in "contextualized print" (Black, 2010, p. 14).

This finding also highlights a need for further research exploring how online sociodramatic play might support concept acquisition for children who face educational barriers, such as those with learning disabilities. For example, the opportunity to acquire literacy concepts during virtual world gameplay via video chat may assist children requiring literacy support and/or with speech difficulties. Interestingly, the heavy saturation of science-based concepts in Minecraft is currently being used to offer disadvantaged children the opportunity to use their imagination to explore natural science concepts and heighten girls' awareness that science-based careers are achievable for women through the program *Science Hunters* run by Lancaster University in the United Kingdom (Hobbs et al., 2019). The potential for girls to acquire natural science-based concepts is pertinent to this study as research suggests 6- to 8-year-old girls are significantly less likely to play Minecraft in home settings than boys the same age (Mavoa et al., 2017, 2018).

6.2.3 Emotional connections are made to products of imagination in a virtual world

Children connecting emotionally to products of imagination in a virtual world represents the third proposed characteristic of play as a leading activity in a digitally-mediated environment. For example, children feel happy and excited when interacting with other avatars and/or non-player characters (NPCs) and exploring in-world environments, children become frustrated by interactions

with other avatars and restrictions of the game design, and children worry about the safety of their avatars. This fundamental characteristic builds on existing findings suggesting children feel happy when interacting with other users in a virtual world (Dezuanni et al., 2015) and virtual pets (Burke, 2013; Sarachan, 2013; Schamroth Abrams, 2016), children feel excited by in-world features of virtual worlds (Dezuanni, 2018), children become frustrated by restrictions of virtual world game designs (Marsh, 2010), and children worry about the safety of their avatars during virtual world gameplay (Dezuanni et al., 2015; Dezuanni, 2018; Schamroth Abrams, 2016).

According to Vygotsky (2004), emotional connections children make to products of imagination during play as a leading activity can influence imaginary situations or be influenced by imaginary situations. Findings in this investigation suggest imaginary play situations in a virtual world are influenced by, and influence, emotional connections children make to products of imagination. For example, children who worry about the safety of their avatars will make decisions that influence imaginary play situations (e.g., choosing to play in 'safe' indoor spaces) and be influenced by imaginary situations (e.g., retreating from perceived threats in play).

This fundamental characteristic provides insight into how 7- to 8-year-old children experience emotions during online sociodramatic play that reflect the critical developmental period emerging at age 7, which sees children in this age group experiencing conflict in certain social situations (Vygotsky, 1998b). For children in this research, data suggested they experienced heightened internal conflicts during imaginary play situations by becoming frustrated with each other and worrying about the safety of their avatars (e.g., getting teleported into lava). In cultural-historical theory, these heightened internal conflicts are representative of the crisis at age 7, however, they reap long term cognitive benefits as they foster children's ability to identify and manage their own and others' affectivity.

6.2.4 Products of imaginative thought in a virtual world manifest in intangible and tangible ways

The fourth characteristic of play as a leading activity in a digitally-mediated environment indicates products of imaginative thought in a virtual world manifest in intangible ways through immaterial symbolic objects and tangible ways through material symbolic objects. Imaginary constructs in a virtual world are used to extend and enhance play in virtual world environments and real-world settings, manifesting as a result of children's internal realities and conceptual understandings about evolving play scenarios. In virtual world environments, children reimagine immaterial symbolic objects to extend and enhance imaginary play situations. For example, children going on a horse-riding adventure in a virtual world reimagine an immaterial symbolic box as a 'backpack', demonstrating a conceptual understanding that backpacks are more suitable than boxes to 'carry' whilst riding a horse.

In real-world settings, findings suggest children use products of imagination in a virtual world to reimagine material symbolic objects to extend and enhance imaginary play situations. For example, children reimagine in-world virtual environments using tangible construction blocks or reimagine informative texts used in a virtual world to label items in a real-world pretend 'shop'. These examples illuminate insight into current understandings about the reflexive, sophisticated, and complex relationship between immaterial concepts in online virtual world spaces and material contexts for play which sees children viewing familiar, tangible play objects in new and transformative ways (Kervin et al., 2015).

Summary

In this section, fundamental characteristics of play as a leading activity in a digitally-mediated environment were explained according to the ways children combine and rework aspects of reality with imagination through combinatorial activities to give rise to this contemporary form of play. These characteristics involved children drawing on real-world and virtual world experiences to inspire imaginative thought and connecting knowledge of real-life phenomena to imaginary situations in a virtual world. Additionally, characteristics described how children make

emotional connections to imaginary situations in a virtual world, and reimagine products of imagination in a virtual world in intangible and tangible ways. The role of adults in the societies in which children live, including virtual world game designers, were recognised as significant in informing combinatorial activities children use during online sociodramatic play. The characteristics of play as a leading activity in a digitally-mediated environment and how they are informed by adults are represented in Figure 6.2.

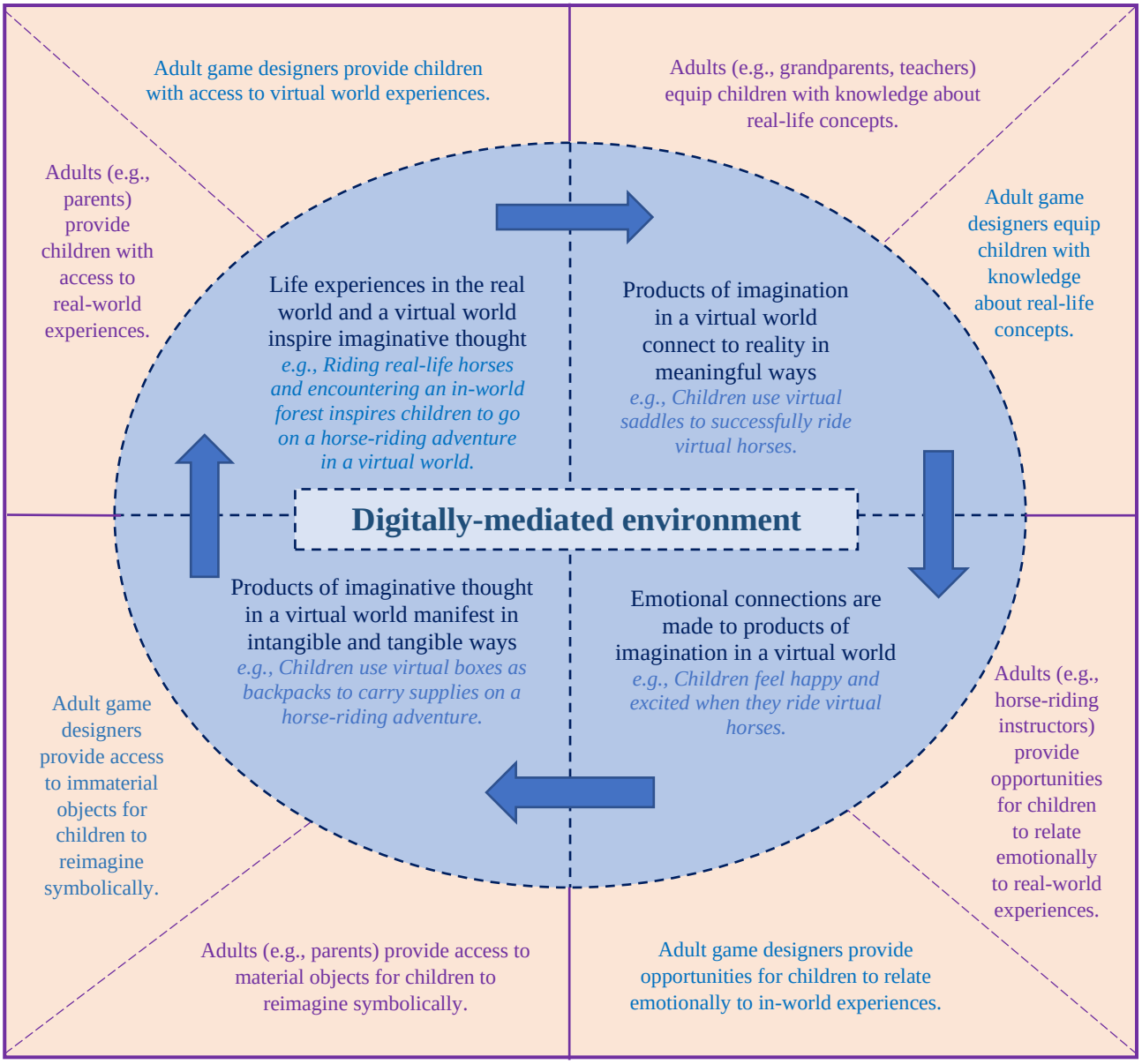

Figure 6.2. Characteristics of play as a leading activity in a digitally-mediated environment.

Importantly, characteristics of online sociodramatic play identified in this research reflect how Vygotsky's ideas about development of the psychological function of imagination in early childhood are applicable in the current digital age, almost a century after they were first theorised. While Vygotsky could not possibly have envisioned separately located children using combinatorial activities to engage in sociodramatic play with each other through networked digital technologies, findings in this research suggest this is now achievable.

Recognising how digital technologies foster development of imagination for the current generation of children is important because, historically, the way humans have used their imagination has significantly impacted the social and cultural lives of people in local and global contexts. Of particular significance is the finding emerging from this research suggesting products of imaginative thought manifest in intangible ways. Living in a pre-digital era, Vygotsky referred to such manifestations as objects that exist in material terms. The ability to produce intangible manifestations of imaginative thought in online spaces, however, means children growing up using digital technologies have increased opportunities to conceptualise imaginary constructs in ways that transcend the physical limitations of material objects.

6.3 Factors influencing children's ability to engage in play as a leading activity in a digitally-mediated environment

For co-located children, sociodramatic play generally evolves effortlessly and spontaneously, requiring minimal input from adults. For children in separate locations, however, findings in this research suggest children's ability to engage in sociodramatic play through networked digital technologies requires facilitation through a range of specific systematic practices influenced by institutional factors and software-related factors.

6.3.1 Institutional factors

In this study, children's ability to successfully, competently, and safely engage in play as a leading activity in a digitally-mediated environment was facilitated by two equally important,

complementary institutional factors: parents in the children's homes and educational professionals at the children's school.

6.3.1.1 The role of parents

While play is generally regarded a naturally spontaneous activity (Bateson, 2015), research suggests digital forms of play are shaped by opportunities provided by parents within the home (Dias et al., 2016; Dong, 2018; Jones & Park, 2015). In this study, findings indicate child participants' parents played a crucial role in facilitating their ability to engage in online sociodramatic play by providing regular access to internet-enabled digital devices equipped with video communication tools and positively viewing digital forms of play. This is important because recent studies argue children's ability to engage in digital forms of play in the home may be limited if parents set restrictive screen time limits (Squire & Steinkuehler, 2017) and/or negatively view children's playful use of digital technologies (Dong, 2018; Isikoglu Erdogan et al., 2019). Research context data in this investigation also highlighted the importance of parents having informed knowledge about resolving problematic technical issues children may encounter when playing together in online spaces (e.g., restarting software, resetting internet connections) to minimise interruptions to play.

6.3.1.2 The role of educators

Findings in this study indicate policies adopted by educational professionals at the child participants' school ensured they had access to iPads equipped with Minecraft: Education Edition. This version of Minecraft is password protected to students attending a particular school meaning children can safely engage as avatars in the same in-world environment without encountering avatars controlled by unknown others. This is important because research context data suggested children's parents did not allow their daughters to engage as avatars using the publicly accessible version of Minecraft due to online safety concerns. This reflects findings from a recent study

indicating online safety is a prominent concern of parents whose children (aged 3- to 12-years-old) engage in multiplayer forms of Minecraft gameplay in the home (Mavoa et al., 2017).

For children who do use publicly accessible multiplayer virtual world software platforms (such as my own children), however, it is imperative parents are supported by educators in promoting online safety practices, as children may inadvertently be exposed by unknown others to inappropriate interactions and/or content (Early Childhood Australia, 2018). Although the general version of Minecraft allows parents to set up a private server for children to safely engage in the same in-world environment, this process involves payment of a monthly subscription fee meaning not all children could access this feature due to family financial constraints. Subscriptions to Minecraft: Education Edition, however, are currently offered free to government schools in several Australian states, including Victoria, the state in which this research was conducted. This means children who attend these schools can access this software platform at no cost to families. This is important because research suggests the price of software applications affects parents' decisions in downloading apps for their children (Kervin et al., 2018). Research context data also revealed children in this study received instructional guidance in using Minecraft: Education Edition from educational professionals at school. This guidance was significant in facilitating acquisition of skills children required to competently and independently connect to the same in-world environment.

6.3.2 Software-related factors

Findings emerging from this research indicate the synchronous use of virtual world technology and video communication tools facilitates separately located children's ability to successfully engage in play as a leading activity according to its theoretically-based defining features and fundamental characteristics. Specific factors related to the use of these software platforms, however, require consideration in order for cognitively beneficial outcomes for children engaging in this contemporary form of play to be suitably supported.

6.3.2.1 The role of virtual world software platforms

An important regulatory consideration when facilitating online sociodramatic play is using virtual worlds free of rules-based games. For example, playing Minecraft in Creative mode rather than Survival mode. Children's motive for play in Survival mode, as the name suggests, is to 'survive' by avoiding or attacking hostile non-player characters. Consequently, children's actions during this mode of play are determined by the rules of the game, hindering their ability to create imaginary situations. This assertion builds on existing findings suggesting the mode of play used by children engaging as avatars in Minecraft impacts in-world play experiences in significant ways (Beavis et al., 2015; Dezuanni, 2018; Kervin et al., 2015; Lane & Yi, 2017). Moreover, research suggests children's ability to create imaginary situations using a wide range of in-world features are restricted by game designs that position users to adopt specific roles (Hafner, 2015), are subscription-based (Kargin, 2018; Marsh, 2011), and/or are embedded with consumerist principles (Burke, 2013; Sarachan, 2013). Flexible, open-ended game designs, however, enable children to create imaginary situations (Lane & Yi, 2017).

6.3.2.2 The role of video communication tools

Currently, most virtual world software platforms for children, including Minecraft, offer text-based chat facilities, but not voice chat facilities. In this study, children only used the text-based chat facility twice, preferring to use video chat to verbally communicate with each other during online play sessions. This finding reflects other studies indicating separately located children prefer to communicate via video chat rather than text-based chat (Austin et al., 2017; Giannakos et al., 2013).

Although two text-based chat messages were used by Louise to send play-related dialogue (see Video Transcript data in Ch. 5, p. 104), these messages were simplistic, brief, and the word 'villagers' was misspelt. Importantly, the messages poorly represented Louise's rather sophisticated ability to express herself verbally, reflecting Vygotsky's (2004) assertion that young children's

written expressions of self are often composed as though they are younger than their actual age. Moreover, reported findings indicated Talia did not see Louise's first text-based chat message. This highlights the ineffectual nature of this form of communication for online sociodramatic play purposes and reflects existing findings suggesting text-based chat restricts meaningful exchanges between child users of virtual worlds (Marsh, 2011; Merchant, 2009; Reich et al., 2014).

Subsequently, in this research, children's use of video chat was essential in facilitating successful exchange of verbal symbolic language and meta-communication strategies. Moreover, communicating verbally enabled children to direct each other to in-world locations of their avatars, which facilitated and expedited sociodramatic play. While children did not use FaceTime to exchange non-verbal meta-communication strategies during imaginary play situations, data indicated this did not hinder their ability to achieve intersubjectivity. Children did, however, use FaceTime to greet each other before commencing online play sessions, heightening an authentic personal connection before engaging as avatars in the same virtual world environment. This reflects assertions by Manstead et al. (2011) that video communication tools create a sense of physical co-presence between separately located people.

Summary

In this section, important institutional and software-related factors influencing children's ability to successfully, competently, and safely engage in play as a leading activity in a digitally-mediated environment in the home setting were identified. In this study, findings-related factors are recognised as 'levers' that enable or constrain children's ability to engage in this contemporary form of play. These levers are represented in Figure 6.3.

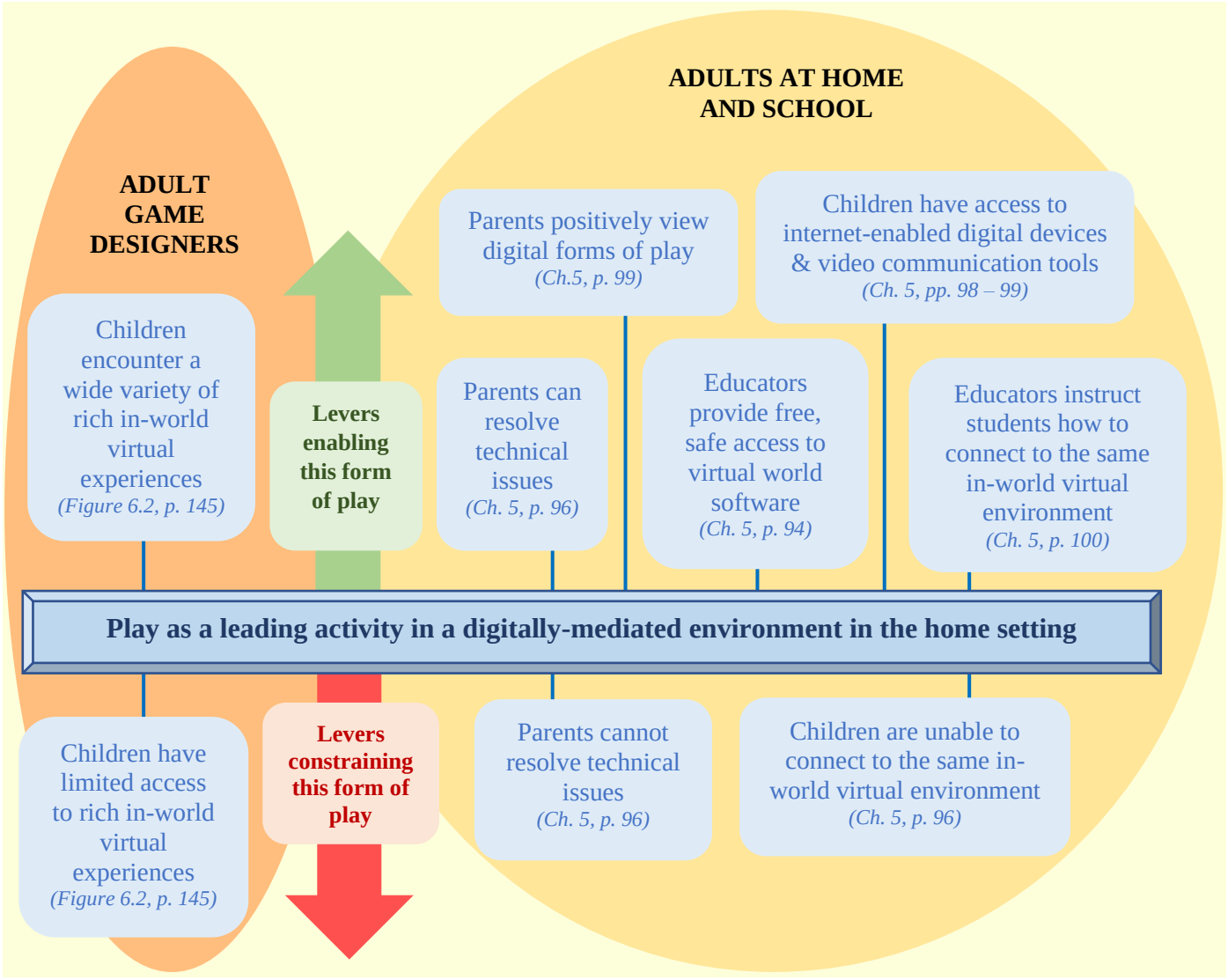

Figure 6.3. Findings-related levers enabling or constraining children's ability to engage in play as a leading activity in a digitally-mediated environment in the home setting.

Other important 'levers' enabling or constraining children's ability to engage in play as a leading activity in a digitally-mediated environment in the home can be informed by the scholarly literature. Such levers are garnered from cultural-historical theoretical understandings about imaginary forms of play and findings from studies reporting on children's use of networked digital technologies (e.g., virtual world software platforms, parents' perspectives). These levers are represented in Figure 6.4.

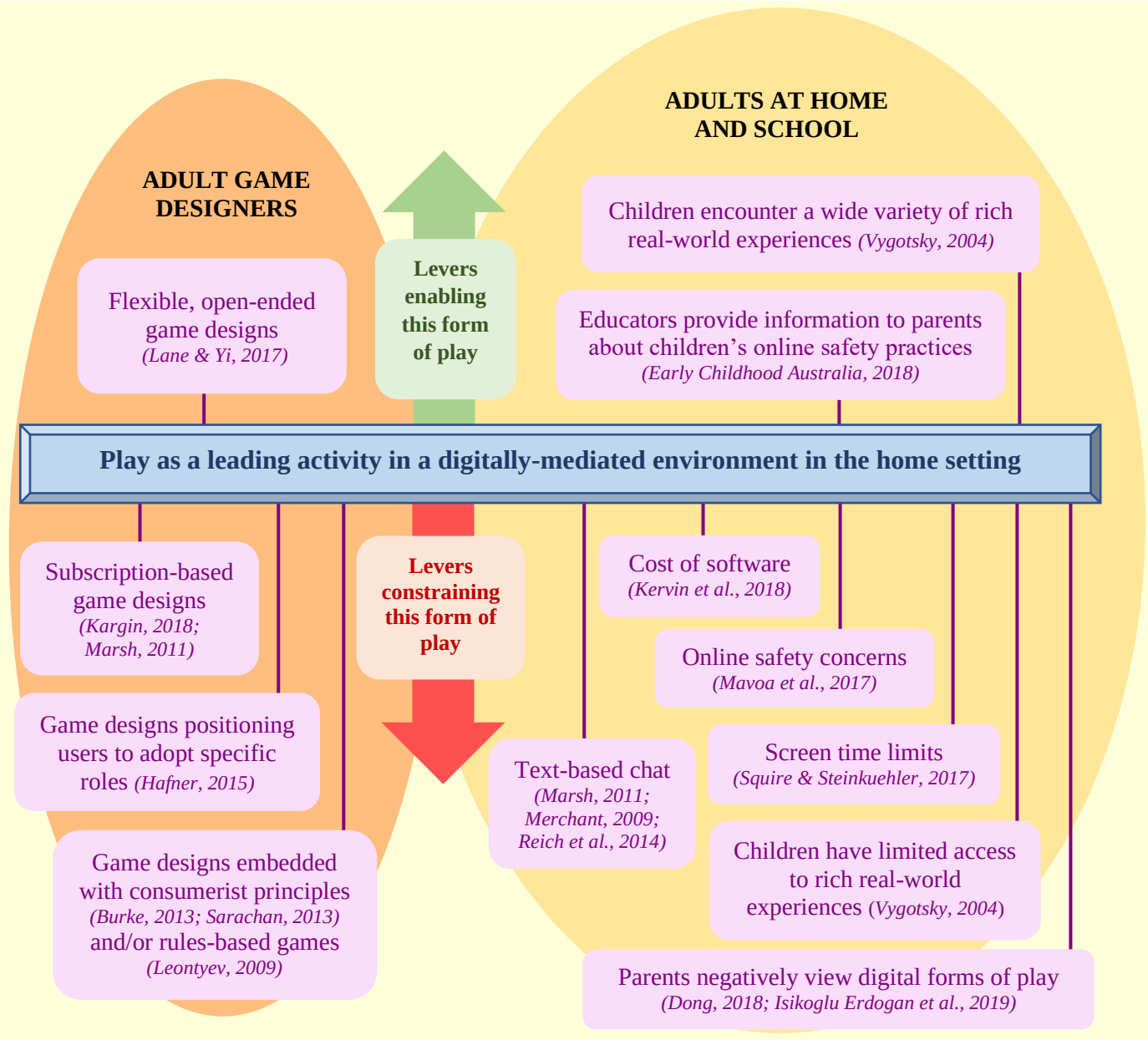

Figure 6.4. Literature-related levers enabling or constraining children's ability to engage in play as a leading activity in a digitally-mediated environment in the home setting.

In this research, findings-related levers and literature-related levers have been combined to provide a complete overview of factors enabling or constraining children's ability to successfully, competently, and safely engage in play as a leading activity in a digitally-mediated environment in the home setting. These levers are represented in Figure 6.5.

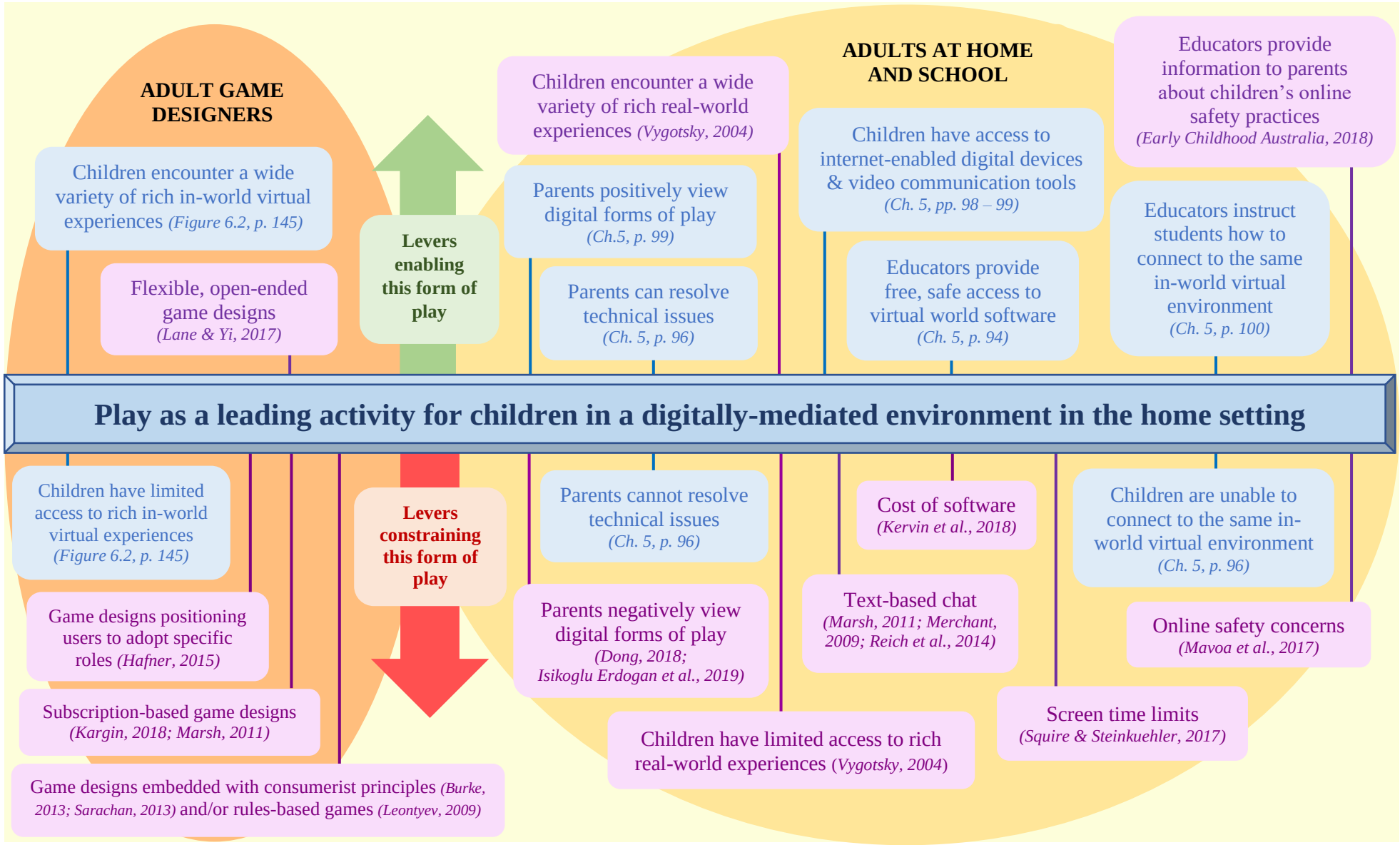

Figure 6.5. Levers enabling or constraining children's ability to engage in play as a leading activity in a digitally-mediated environment in the home setting.

Conclusion

In this chapter, reported findings emerging from this research informed a richly detailed description of defining features and fundamental characteristics of play as a leading activity (sociodramatic play) in a digitally-mediated environment, hence answering the research question guiding this study:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

It was established that using virtual world technology and video communication tools synchronously facilitates a viable means for separately located children to engage in sociodramatic play in an online space. This makes a significant contribution to new knowledge as current understandings about traditional forms of sociodramatic play are based on co-located children in the same physical space. By drawing on the cultural-historical theoretical concept of *play as a leading activity* as the unit of analysis in this study, cognitive benefits for children engaging in this online play practice were clearly identifiable. Moreover, adopting a cultural-historical approach to research ensured important factors contributing to children's ability to engage in online sociodramatic play with separately located peers were recognised. Establishing a close link between the theoretical framework and the methodological approach informing this study enabled new knowledge to emerge that can inform parents about using specific software platforms in ways that foster children's cognitive developmental outcomes. In the next chapter, a concluding summary of this investigation will detail how new knowledge emerging from this study makes a significant contribution to current understandings about cognitively beneficial forms of play in online spaces.

Chapter 7 Conclusion

Introduction

This research examined how two separately located 7- to 8-year-old children engaged in sociodramatic play using networked digital technologies. This chapter will explain how the aim of this study was addressed and how the research question was answered. The significance of new knowledge emerging from key findings reported in this investigation is explained. Practical implications arising from this research are identified and limitations and recommendations relating to this study are considered. The chapter concludes with a personal reflection conveyed from the researcher's perspective and a summation of the overall significance of this study.

7.1 Addressing the aim of the research

In this research, children in separate home settings engaged as avatars in the same online virtual world environment whilst synchronously using video communication tools to discuss their play. A review of the scholarly literature indicated little is currently known about this contemporary form of play. Consequently, the aim of this research was to gain insight into how networked digital technologies facilitate online forms of play for separately located children. To address the aim of the research, the cultural-historical theoretical concept of *play as a leading activity* was selected to represent the unit of analysis so deeper insight could be gained into cognitive benefits reaped by children engaging in sociodramatic play in an online space. This led to formulation of the research question guiding this investigation:

> What does play as a leading activity look like for children in a digitally-mediated environment in the home setting?

7.2 Answering the research question

Underpinned by interpretivist philosophical assumptions, this research sought to gain insight into a complex, unique social phenomenon from the point of view of those who experience it in a specific cultural setting. In alignment with this philosophy, the cultural-historical approach to research (Hedegaard & Fleer, 2008) was selected to inform the methodology of this study. This

meant dialectical-interactive methods were used to gain meaningful insight into the social situation of child development under investigation, *action in imaginary situations*, and identify important institutional factors influencing children's ability to engage in this activity.

The unit of analysis in this research, *play as a leading activity*, was identified as a bounded system and, subsequently, a qualitative single-case study was selected as the research design. This enabled a richly detailed description of the unit of analysis to be reported. An integral component of this description involved explaining how this form of play supports children's cognitive developmental outcomes. Engaging in play as a leading activity in a digitally-mediated environment was considered as primarily contributing to development of the central psychological function of memory in preschool and early school age children.

Further cognitive benefits for children in this age group were identified as development of intentional behaviours, reflective thinking, abstract thought, more sophisticated intentional behaviours, and an awakening of children's zone of proximal development. Moreover, this contemporary form of play was acknowledged as providing opportunities for children to advance toward a mastery of play. This was identified as a crucial step in a child's cognitive development as, from a cultural-historical perspective, mastering play prepares children to be psychologically capable of paying attention to common learning activities at school.

Importantly, a significant cognitive benefit for children engaging in play as a leading activity in a digitally-mediated environment was recognised as development of the psychological function of imagination. In this study, Vygotsky's (2004) four combinatorial activities were used as deductive codes to analyse how child participants combined and reworked elements of reality with imagination to give rise to play as a leading activity in a digitally-mediated environment. Deductive codes were inductively analysed according to themes emerging from the data and thematically adjusted to represent the four key findings in this study. These key findings were identified as fundamental characteristics of this contemporary form of play. Each key finding offers particular

significance in contributing new knowledge to current understandings about children's play in online spaces.

7.3 Overview and significance of the findings

In this section, the four key findings representing fundamental characteristics of play as a leading activity in a digitally-mediated environment will be re-examined in relation to their significance in contributing new knowledge about online forms of children's play.

7.3.1 Key Finding 1

The first key finding, *Life experiences in the real world and a virtual world inspire imaginative thought*, is significant as it highlights the potential for in-world virtual experiences to represent additional rich materials children draw on to inspire imaginative thought. Vygotsky (2004) described these 'rich materials' as impressions made on children during their everyday lives that are then reinterpreted by children to "construct a new reality" (p. 11) reflective of their individual needs through imaginary play situations. Consequently, encountering in-world virtual experiences expands children's access to such impressions and contributes to development of a richer imagination. This finding also indicates a need for further research into the potential for interactive virtual world gameplay to provide increased opportunities for vulnerable children (e.g., those from low-income families, with disabilities, and/or serious medical conditions) to access a wider variety of rich materials to inspire imaginative thought.

7.3.2 Key Finding 2

The second key finding, *Products of imagination in a virtual world connect to reality in meaningful ways*, is significant as it recognises virtual world software platforms as providing children, particularly those who face educational barriers, with opportunities to acquire knowledge about real-life phenomena (e.g., natural science and mathematical concepts) that can be meaningfully connected to products of imagination during online sociodramatic play. This key finding also potentially holds significance for future educational policy as several conceptual

understandings children in this research acquired during interactive gameplay in Minecraft aligned with specific essential learning outcomes prescribed in the Australian Curriculum.

7.3.3 Key Finding 3

The significance of the third key finding, *Emotional connections are made to products of imagination in a virtual world*, is based on the premise that online sociodramatic play provides opportunities for separately located children to develop their ability to manage their own and others' affectivity within imaginary play situations. From a cultural-historical theoretical perspective, learning to manage one's own emotions and the emotions of others is considered a crucial step in the psychological development of 7- to 8-year-old children as it leads to long term benefits by fostering children's ability to negotiate social relationships with others in everyday cultural settings (e.g., homes, schools, future work environments).

7.3.4 Key Finding 4

The fourth key finding, *Products of imaginative thought in a virtual world manifest in intangible and tangible ways*, is significant as the 'intangible' component of this finding contributes new knowledge about how children reimagine aspects of virtual worlds using immaterial, symbolic objects to extend and enhance imaginary play situations. This highlights the potential for online sociodramatic play to provide opportunities for children to reimagine immaterial, symbolic objects in ways unbounded by physical constraints. Such physical constraints include being co-located in the same real-world space using material, symbolic objects available within that space.

Summary

In this section, an overview of the four key findings emerging from this research was presented. These key findings were identified as fundamental characteristics of play as a leading activity in a digitally-mediated environment. The significance of new knowledge embedded within each key finding was identified and explained. A summary of this new knowledge is: 1) Virtual world experiences may expand children's access to rich materials that inspire imaginative thought;

2) Virtual world gameplay potentially equips children with knowledge about real-life phenomena they can use to inform imaginary play situations; 3) Online sociodramatic play could foster children's ability to manage their own and others' affectivity; and 4) Online sociodramatic play in a virtual world may provide opportunities for children to reimagine immaterial, symbolic objects to extend and enhance in-world imaginary play situations. New knowledge emerging from these key findings contribute to a deeper understanding about cognitive benefits reaped by children engaging in this contemporary form of play.

7.4 Implications of the research

Findings emerging from this research have significant implications in terms of informing child developmental theories, policies, and practices. First, current sociodramatic play theories are based on children playing together in a co-located space. Therefore, Figure 6.1 (Creating an imaginary situation in a digitally-mediated environment, p. 127) and Figure 6.2 (Characteristics of play as a leading activity in a digitally-mediated environment, p. 145) could be used as cultural-historical theoretical models conceptualising different components of online sociodramatic play for separately located children. Second, the four key findings could inform early childhood educational policies focused on fostering development of children's imagination (Key Findings 1 and 4); real-life conceptual understandings (Key Finding 2); and emotional awareness (Key Finding 3).

Finally, the 'levers' enabling or constraining children's ability to engage in play as a leading activity in a digitally-mediated environment detailed in Figure 6.5 (see Ch. 6, p. 153) could be used to inform a set of guidelines that assists parents to facilitate online sociodramatic play for children (see Appendix I for an example of such guidelines). Heightening parents' awareness about using specific software platforms to scaffold cognitively beneficial forms of play empowers them to make informed decisions about their children's digital play practices. This is important because recent studies indicate many parents who positively view children's use of digital technologies are unclear how to use them for learning opportunities in the home (see Ch. 2, p. 21).

Such guidelines could be incorporated into publications distributed by national and international early childhood advocacy organisations (e.g., *Statement on Young Children and Digital Technologies* published by Early Childhood Australia) or disseminated to families through schools. Research suggests educators play an instrumental role in equipping parents with informed knowledge about using digital technologies to provide learning opportunities for children (Chaudron et al., 2020; Sergi et al., 2017). Distribution of guidelines would directly address the purpose of this research which was to inform parents about recognising the potential for digital forms of play to support children's cognitive developmental outcomes.

7.5 Limitations

This research is subject to three methodologically-based limitations: 1) technical issues in the research setting; 2) interview protocols; and 3) research sample. First, technical issues in the research setting were problematic during data collection when children had difficulty connecting as avatars in the same in-world environment. These technical issues had potential to limit data collection within the allocated time frame for home visits (approximately 30 minutes). Fortunately, adults in the research setting (including myself) resolved these issues enabling sufficient data to be collected. This limitation, however, highlights the importance of researchers, or other adults within a research setting, having informed knowledge about resolving potential technical issues when investigating online forms of children's play. This limitation also heightens awareness about setting flexible time limits for data collection visits when studying children's use of digital technologies to allow for the possibility of technical issues arising.

The second limitation relates to interview protocols. Ethical constraints of this study stipulated each child participant only viewed video recorded data from their own home visit, not the other child's home visit. This meant child interview questions were limited to asking each child about play episodes recorded in their own home setting. While interview data generated in this study was sufficient for data analysis purposes, adjusting ethical constraints to allow children to

view relevant aspects of recorded play sessions from both home settings may have widened the scope of data.

The third limitation of this study relates to the research sample. In this investigation, the generalisability of the findings may be limited due to the small sample size (two children) and demographics relating to gender (both females) and socio-economic status (middle to high income families) of child participants. Findings from collected data, however, illuminated insight into the nature of children's online sociodramatic play according to a priori, theoretically-based, deductive codes. This means insight was gained into specific aspects of imaginary play situations, not the child participants themselves. Moreover, the qualitative single-case study research design used in this investigation required collected data to be representative of the case, *play as a leading activity*, and set parameters bounding the case did not relate to gender or socio-economic status.

7.6 Recommendations

Findings emerging from this investigation illuminate insight into how networked digital technologies facilitate a contemporary form of sociodramatic play for separately located children. There are several recommendations that hold potential for gaining further insight into little known aspects related to this topic. The first recommendation involves seeking children's perspectives about the 'levers' of play identified in this research (see Figure 6.5, Ch. 6, p. 153). This type of investigation would examine how children view such levers (e.g., screen time schedules, school-based instructional sessions) and inform adults (e.g., parents, educators) about optimising institutional-based practices to support child development in digital contexts.

The second recommendation proposes a study exploring potential differences between the ways girls and boys engage in online sociodramatic play. Research suggests co-located girls and boys "have distinctive play styles characterized by particular roles, themes, and actions" (Monighan Nourot, 2006, p. 94). Therefore, this type of study would offer theoretically-based insights into gendered play in online settings. The third recommendation involves a future study seeking to

promote 6- to 8-year-old girls' engagement in Minecraft. Findings in this research indicate the female child participants connected their knowledge of a large proportion of natural science concepts during Minecraft gameplay. Recent studies, however, indicate girls in this age group are significantly less likely to play Minecraft compared to boys the same age (Mavoa et al., 2017, 2018). Findings from this type of investigation would inform educational policies and practices aiming to encourage girls' involvement in natural science-based learning activities.

The fourth recommendation for a future study proposes seeking to define and classify specific meta-communication strategies used by children during online sociodramatic play. This type of study would build on current theoretically-based understandings about co-located children's use of such strategies to achieve intersubjectivity during sociodramatic play. The final recommendation involves exploring how children use knowledge of real-life phenomena to inform imaginary play situations in a virtual world and the extent to which this knowledge relates to, and reflects, age-specific Key Learning Areas in the Australian Curriculum and/or global-based curriculum documents (e.g., International Baccalaureate®). This type of study would better inform educators and policy-makers about the potential for interactive virtual world gameplay to address specific curriculum learning outcomes.

7.7 Personal reflection

Conducting this research offered much personal insight into potential cognitive benefits reaped by my own children when they engaged in sociodramatic play in the same virtual world environment via video chat with separately located peers. I also personally related to the lived experiences of the parents I interviewed in this research (Michelle and John) as several of their responses reflected my own family's experience of this contemporary play practice. For example, I concurred with Michelle's view that this form of play 'sounds like' play in real-world settings and I identified with John when he stated that he appreciated this form of play as it enabled his daughter to interact with a friend when family life logistics impeded co-located forms of play.

The significance of John's statement, however, became increasingly apparent a few weeks after his parent interview when, in response to the global COVID-19 pandemic, lockdown measures were introduced nationally and internationally. Suddenly, children's ability to engage in play in co-located spaces became untenable. This unexpected global event further highlights the importance of this research in examining cognitively beneficial forms of play for separately located children through networked digital technologies. Lockdown measures meant many children moved to home-based online remote learning, which interestingly, provided me with insight into a new development in online forms of play for separately located children.

This new development involved my youngest daughter Beth, aged 12-years-old, and four of her real-world school friends (all located in their own home settings) collectively engaging as avatars in the same virtual world environment via video chat. To engage in this interactive group-based play activity, the girls were using their own personal tablet devices equipped with the Roblox® virtual world software platform synchronously with Zoom® video conferencing software accessed via their school-based laptops. Zoom was being used by these children to facilitate class meetings during periods of remote learning in Term 2 (and extended into Term 3 in the state of Victoria where these children reside) of the 2020 Australian school year.

This fascinating development in the subject of this research, also wholly initiated and facilitated by the children themselves, reflected the changing landscape of online forms of children's play. This lockdown-induced contemporary play practice further highlighted children's exceptional ability to independently facilitate socially interactive forms of play with separately located peers by appropriating networked digital technologies and software platforms available to them.

7.8 Summation

Findings emerging from this research indicate the synchronous use of carefully selected virtual world software platforms and video communication tools effectively facilitates

sociodramatic play for children in separate locations. This assertion makes a significant contribution to current theoretically-based understandings about the potential for networked digital technologies to scaffold traditional forms of children's play in contemporary contexts. For Vygotsky (2016), children's "greatest achievements are possible in play" (p. 25) and the opportunity to create and enact imaginary play situations with separately located peers suggests the current generation of children can achieve in ways that existed only in the imaginations of children from previous generations.

Conclusion

This chapter explained how the aim of this study was addressed and how the research question was answered. The significance of key findings emerging from this investigation were identified and new knowledge embedded within these findings was detailed. The implications and limitations of this study were clarified and a selection of recommendations for future studies that build on findings reported in this research were described. The chapter concluded with a researcher's reflection that highlighted the heightened value of this research in light of recent global events and a summation of the overall significance of this investigation.

Glossary

- *agent*: a small robot used to teach coding skills in Minecraft: Education Edition
- *Creative mode*: a mode of play where users safely explore in-world environments without being exposed to hostile, non-player characters (e.g., witches and skeletons)
- *inventory*: a pop-up box displaying the range of symbolic objects available for users (e.g., tools, food, construction materials)
- *Pillager outpost:* a structure used to house hostile non-player characters known as *Pillagers* who use powerful crossbows to attack users' avatars
- *Nether*: an underground world made up of caverns, lava pits, and fortresses
- *Nether portal*: a vertical, rectangular structure constructed by a user to transport an avatar to the Nether
- *non-player character* (NPC): a character (e.g., person, animal, creature) controlled by the software gaming platform
- *selfie:* a modern term used to describe a photograph taken of oneself. In Minecraft: Education Edition, a camera is available for users to take selfies and screenshots
- *shulker box*: a portable cube-shaped chest used to store items
- *skin:* an image used to dress an avatar a certain way, similar to a costume
- *spawn*: to make a non-player creature appear by placing a 'spawn egg' of the desired creature on the surface of the in-world environment
- *Survival mode*: a mode of play where users' avatars are exposed to hostile, non-player characters (e.g., zombies and spiders)
- *tame:* to change a wild non-player animal into a pet by riding it or offering it a certain food (e.g., a horse eats apples but not meat; a wolf/dog eats meat but not apples)
- *teleport:* a function enabling a user to transport another user's avatar to the same location

References

Austin, N., Hampel, R., & Kukulska-Hulme, A. (2017). Video conferencing and multimodal expression of voice: Children's conversations using Skype for second language development in a tele-collaborative setting. *System, 64,* 87–103. doi:10.1016/j.system.2016.12

Australian Curriculum, Assessment, and Reporting Authority. (2018). *The Australian Curriculum V 8.4*. https://www.australiancurriculum.edu.au

Ballagas, R., Kaye, J., Ames, M., Go, J., & Raffle, H. (2009). Family communication: Phone conversations with children. *Proceedings of the 8th International Conference on Interaction Design and Children, Italy,* 321–324. doi:10.1145/1551788.1551874

Bateson, P. (2015). Playfulness and creativity. *Current Biology*, *25*(1), R12–R16. doi:10.1016/j.cub.2014.09.009

Beavis, C., Muspratt, S., & Thompson, R. (2015). 'Computer games can get your brain working': Student experience and perceptions of digital games in the classroom. *Learning, Media and Technology*, *40*(1), 21– 42. doi:10.1080/17439884.2014.904339

Black, R. W. (2010). The language of Webkinz: Early childhood literacy in an online virtual world. *Digital Culture & Education*, *2*(1), 7–24. https://www.digitalcultureandeducation.com

Black, R. W., & Reich, S. M. (2012). A sociocultural approach to exploring virtual worlds. In G. Merchant, J. Gillen, J. Marsh & J. Davies (Eds.), *Virtual literacies: Interactive spaces for young children* (pp. 27–40). doi:10.4324/9780203096468

Bodrova, E., Germeroth, C., & Leong, D. J. (2013). Play and self-regulation: Lessons from Vygotsky. *American Journal of Play*, *6*(1), 111–123. https://www.journalofplay.org

Bodrova, E., & Leong, D. J. (2007). *Tools of the mind: The Vygotskian approach to early childhood education*. Pearson Education Inc.

Bodrova, E., & Leong, D. J. (2015). Vygotskian and post-Vygotskian views on children's play. *American Journal of Play, 7*(3), 371–388. https://www.journalofplay.org

Bower, M., Lee, M. J. W., & Dalgarno, B. (2017). Collaborative learning across physical and virtual worlds: Factors supporting and constraining learners in a blended reality environment. *British Journal of Educational Technology, 48*(2), 407–430. doi:10.1111/bjet.12435

Burke, A. (2013). Children's construction of identity in virtual play worlds: A classroom perspective. *Language and Literacy, 15*(1), 58–73. doi:10.20360/G2V01M

Burnett, C. (2016). *The digital age and its implications for learning and teaching in the primary school*. http://cprtrust.org.uk/wp-content/uploads/2016/07/Burnett-report-20160720.pdf

Burnett, C., & Merchant, G. (2014). Points of view: Reconceptualising literacies through an exploration of adult and child interactions in a virtual world. *Journal of Research in Reading, 37*(1), 36–50. doi:10.1111/jrir.12006

Chaudron, S., Di Gioia, R., & Gemo, M. (2020). Safety issues in young children's digital literacy practices at home. In O. Erstad, R. Flewitt, B. Kümmerling-Meibauer & Í. S. Pires Pereira (Eds.), *The Routledge handbook of digital literacies in early childhood* (pp. 134–145). doi:10.4324/9780203730638

Chowdhury, M. F. (2014). Interpretivism in aiding our understanding of the contemporary social world. *Open Journal of Philosophy, 4,* 432–438. doi:10.4236/ojpp.2014.43047

Clavering, E. K., & McLaughlin, J. (2010). Children's participation in health research: From objects to agents? *Child: Care, Health and Development, 36*(5), 603–611. doi:10.1111/j.1365-2214.2010.01094.x

Corsaro, W. A. (2015). *The sociology of childhood* (4th ed.). SAGE Publications Inc.

Creswell, J. W. (2014). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5th ed.). Pearson.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among the five approaches* (4th ed.). SAGE Publications Inc.

Danby, S., Evaldsson, A., Melander, H., & Aarsand, P. (2018). Situated collaboration and problem solving in young children's digital gameplay. *British Journal of Educational Technology*, *49*(5), 959–972. doi:10.1111/bjet.12636

Danby, S., Fleer, M., Davidson, C., & Hatzigianni, M. (2018). *Digital childhoods: Technologies and children's everyday lives.* https://link.springer.com/book/10.1007/978-981-10-6484-5

Davydov, V. V. (1995). The influence of L. S. Vygotsky on education, theory, research, and practice. *Educational Researcher*, *24*(3), 12–21. doi:10.3102/0013189X024003012

Denzin, N. K., & Lincoln, Y. S. (2018). *The SAGE handbook of qualitative research* (5th ed.). SAGE Publications Inc.

Dezuanni, M., O'Mara, J., & Beavis, C. (2015). 'Redstone is like electricity': Children's performative representations in and around Minecraft. *E-Learning and Digital Media*, *12*(2), 147–163. doi:10.1177/2042753014568176

Dezuanni, M. (2018). Minecraft and children's digital making: Implications for media literacy education. *Learning, Media and Technology*, *43*(3), 236–249. doi:10.1080/17439884.2018.1472607

Dias, P., Brito, R., Ribbens, W., Daniela, L., Rubene, Z., Dreier, M., Gemo, M., Di Gioia, R., & Chaudron, S. (2016). The role of parents in the engagement of young children with digital technologies: Exploring tensions between rights of access and protection, from 'Gatekeepers' to 'Scaffolders'. *Global Studies of Childhood*, *6*(4), 414–427. doi:10.1177/2043610616676024

Dong, P. I. (2018). Exploring Korean parents' meanings of digital play for young children. *Global Studies of Childhood*, *8*(3), 238–251. doi:10.1177/2043610618798931

Duncan, R., & Tarulli, D. (2003). Play as the leading activity of the preschool period: Insights from Vygotsky, Leont'ev, and Bakhtin. *Early Education and Development*, *14*(3), 271–292. doi:10.1207/s15566935eed1403_2

Early Childhood Australia. (2018). *Statement on young children and digital technologies*. doi:10.23965/ECA.001

Ebbeck, M., Yim, H. Y. B., Chan, Y., & Goh, M. (2016). Singaporean parents' views of their young children's access and use of technological devices. *Early Childhood Education Journal, 44*(2), 127–134. doi:10.1007/s10643-015-0695-4

Edwards, S. (2011). Lessons from 'a really useful engine'™: Using Thomas the Tank Engine™ to examine the relationship between play as a leading activity, imagination and reality in children's contemporary play worlds. *Cambridge Journal of Education, 41*(2), 195–210. doi:10.1080/0305764X.2011.572867

El'Konin, D. B. (1999). Toward the problem of stages in the mental development of children. *Journal of Russian & East European Psychology, 37*(6), 11–30. doi:10.2753/RPO1061-0405370611

El'Konin, D. B. (2005a). Chapter 1: The subject of our research: The developed form of play. *Journal of Russian & East European Psychology, 43*(1), 22–48. doi:10.1080/10610405.2005.11059242

El'Konin, D. B. (2005b). The psychology of play. *Journal of Russian & East European Psychology, 43*(1), 11–21. doi:10.1080/10610405.2005.11059245

Farrell, A., Tayler, C., & Tennent, L. (2004). Building social capital in early childhood education and care: An Australian study. *British Educational Research Journal, 30*(5), 623–632. doi:10.1080/0141192042000234610

Fleer, M. (2008a). Interpreting research protocols–the institutional perspective. In M. Hedegaard & M. Fleer (Eds.), *Studying children: A cultural-historical approach* (pp. 65–103). Open University Press.

Fleer, M. (2008b). Using digital video observations and computer technologies in a cultural-historical approach. In M. Hedegaard & M. Fleer (Eds.), *Studying children: A cultural-historical approach* (pp. 104–117). Open University Press.

Fleer, M. (2016). Theorising digital play: A cultural-historical conceptualisation of children's engagement in imaginary digital situations. *International Research in Early Childhood Education, 7*(2), 75–90. https://files.eric.ed.gov/fulltext/EJ1138705.pdf

Genc, Z. (2014). Parents' perceptions about the mobile technology use of preschool aged children. *Procedia: Social and Behavioural Sciences, 146*, 55–60. doi:10.1016/j.sbspro.2014.08.086

Giannakos, M. N., Chorianopoulos, K., Inkpen, K., Du, H., & Johns, P. (2013). Understanding children's behaviour in an asynchronous video-mediated communication environment. *Personal and Ubiquitous Computing, 17*(8), 1621–1629. doi:10.1007/s00779-012-0525-2

Gillen, J., & Merchant, G. (2012). From virtual histories to virtual literacies. In G. Merchant, J. Gillen, J. Marsh & J. Davies (Eds.), *Virtual literacies: Interactive spaces for young children* (pp. 9–26). doi:10.4324/9780203096468

Göncü, A. (1993). Development of intersubjectivity in social pretend play. *Human Development, 36*(4), 185–198. doi:10.1159/000278206

Göncü, A., & Gaskins, S. (2011). Comparing and extending Piaget's and Vygotsky's understandings of play: Symbolic play as individual, sociocultural, and educational interpretation. In P. E. Nathan & A. D. Pellegrini (Eds.), *The Oxford handbook of the development of play* (pp. 48–57). doi:10.1093/oxfordhb/9780195393002.013.0005

Gutiérrez, K. D. (2008). Developing a sociocultural literacy in the third space. *Reading Research Quarterly, 43*(2), 148–164. doi:10.1598/RRQ.43.2.3

Hafner, C. A. (2015). Co-constructing identity in virtual worlds for children. In R. H. Jones, A. Chik & C. A. Hafner (Eds.), *Discourse and digital practices: Doing discourse analysis in the digital age* (pp. 97–111). Routledge.

Hatch, J. A. (2002). *Doing qualitative research in education settings*. State University of New York Press.

Hedegaard, M. (2008a). Developing a dialectic approach to researching children's development. In M. Hedegaard & M. Fleer (Eds.), *Studying children: A cultural-historical approach* (pp. 30–45). Open University Press.

Hedegaard, M. (2008b). Principles for interpreting research protocols. In M. Hedegaard & M. Fleer (Eds.), *Studying children: A cultural-historical approach* (pp. 46–64). Open University Press.

Hedegaard, M. (2008c). The role of the researcher. In M. Hedegaard & M. Fleer (Eds.), *Studying children: A cultural-historical approach* (pp. 202–207). Open University Press.

Hedegaard, M., & Fleer, M. (2008). *Studying children: A cultural-historical approach*. Open University Press.

Henderson, M., Johnson, N. F., & Auld, G. (2013). Silences of ethical practice: Dilemmas for researchers using social media. *Educational Research and Evaluation, 19*(6), 546–560. doi:10.1080/13803611.2013.805656

Hobbs, L., Stevens, C., Hartley, J., & Hartley, C. (2019). Science Hunters: An inclusive approach to engaging with science through Minecraft. *Journal of Science Communication, 18*(2), 1–12. doi:10.22323/2.18020801

Huber, B., Highfield, K., & Kaufman, J. (2018). Detailing the digital experience: Parent reports of children's media use in the home learning environment. *British Journal of Educational Technology, 49*(5), 821–833. doi:10.1111/bjet.12667

Isikoglu Erdogan, N., Johnson, J. E., Dong, P. I., & Qiu, Z. (2019). Do parents prefer digital play? Examination of parental preferences and beliefs in four nations. *Early Childhood Education Journal, 47*(2),131–142. doi:10.1007/s10643-018-0901-2

Johnson, J. E. (2006). Play development from ages four to eight. In D. Pronin Fromberg & D. Bergen (Eds.), *Play from birth to twelve: Contexts, perspectives and meanings* (2nd ed., pp. 13–20). Routledge.

Jones, I., & Park, Y. (2015). Virtual worlds: Young children using the Internet. In K. L. Heider & M. Renck Jalongo (Eds.), *Young children and families in the information age: Applications of technology in early childhood.* doi:10.1007/978-94-017-9184-7_1 2015

Kappas, A., & Krämer, N. C. (2011). *Face-to-face communication over the internet: Emotions in a web of culture, language, and technology*. Cambridge University Press.

Kargin, T. (2018). The commercial side of virtual play worlds. *Phi Delta Kappan, 99*(6), 14–19. doi:10.1177/0031721718762417

Karpov, Y. V. (2005). *The neo-Vygotskian approach to child development*. Cambridge University Press.

Kervin, L., Verenikina, I., & Rivera, M. C. (2015). Collaborative onscreen and offscreen play: Examining meaning-making complexities. *Digital Culture & Education, 7*(2), 228–239. https://ro.uow.edu.au/cgi/viewcontent.cgi?article=2945&context=sspapers

Kervin, L., Verenikina, I., & Rivera, C. (2018). Digital play and learning in the home: Families' perspectives. In S. J. Danby, M. Fleer, C. Davidson & M. Hatzigianni (Eds.), *Digital childhoods: Technologies and children's everyday lives* (pp. 117–130). doi:10.1007/978-981-10-6484-5_8

Kivunja, C., & Kuyini, A. B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education, 6*(5), 26–41. doi:10.5430/ijhe.v6n5p26

Kravtsov, G. G., & Kravtsova, E. E. (2010). Play in L. S. Vygotsky's nonclassical psychology. *Journal of Russian & East European Psychology*, *48*(4), 25–41. doi:10.2753/ RPO1061-0405480403

Kravtsova, E. E. (2006). The concept of age-specific new psychological formations in contemporary developmental psychology. *Journal of Russian & East European Psychology, 44*(6), 6–18. doi:10.2753/RPO1061-0405440601

Kuhn, J. (2018). Minecraft: Education Edition. *Calico Journal*, *35*(2), 214–223. doi:10.1558/cj.34600

Lane, H. C., & Yi, S. (2017). Playing with virtual blocks: Minecraft as a learning environment for practice and research. In F. C. Blumberg & P. J. Brooks (Eds.), *Cognitive development in digital contexts* (pp. 145–166). doi:10.1016/C2015-0-06250-5

Leontyev, A. N. (2009). *The development of mind*. Marxists Internet Archive.

Manstead, A. S. R., Lea, M., & Goh, J. (2011). Facing the future: Emotion communication and the presence of others in the age of video-mediated communication. In A. Kappas & N. C. Krämer (Eds.), *Face-to-face communication over the internet: Emotions in a web of culture, language, and technology* (pp. 144–175). doi:10.1017/CBO9780511977589.009

Marsh, J. (2010). Young children's play in online virtual worlds. *Journal of Early Childhood Research, 8*(1), 23–39. doi:10.1177/1476718X09345406

Marsh, J. (2011). Young children's literacy practices in a virtual world: Establishing an online interaction order. *Reading Research Quarterly, 46*(2), 101–118. doi:10.2307/41203416

Mavoa, J., Carter, M., & Gibbs, M. (2017). Beyond Addiction: Positive and negative parent perceptions of Minecraft play. *Proceedings of the Annual Symposium on Computer-Human Interaction in Play, The Netherlands,* 171–181. doi:10.1145/3116595.3116638

Mavoa, J., Carter, M., & Gibbs, M. (2018). Children and Minecraft: A survey of children's digital play. *New Media & Society, 20*(9), 3283–3303. doi:10.1177/1461444817745320

Mawer, M. (2016). Observational practice in virtual worlds: Revisiting and expanding the methodological discussion. *International Journal of Social Research Methodology, 19*(2), 161–176. doi:10.1080/13645579.2014.936738

McLean, K., & Edwards, S. (2015). Beginning the conversations about young children's engagement with technology in contemporary times. In S. Garvis & N. Lemon (Eds.), *Understanding digital technologies and young children: An international perspective* (pp. 155–165). Routledge.

Merchant, G. (2009). Literacy in virtual worlds. *Journal of Research in Reading*, *32*(1), 38–56. doi:10.1111/j.1467-9817.2008.01380.x

Merchant, G., Gillen, J., Marsh, J., & Davies, J. (2012). *Virtual literacies: Interactive spaces for young children*. doi:10.4324/9780203096468

Merriam, S. B. (1998). *Qualitative research and case study applications in education*. Jossey-Bass.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. Jossey-Bass.

Monighan Nourot, P. (2006). Sociodramatic play: Pretending together. In D. Pronin Fromberg & D. Bergen (Eds.), *Play from birth to twelve: Contexts, perspectives and meanings* (2nd ed., pp. 87–101). Routledge.

Mustola, M., Koivula, M., Turja, L., & Laakso, M. (2018). Reconsidering passivity and activity in children's digital play. *New Media & Society*, *20*(1), 237–254. doi:10.1177/1461444816661550

Nansen, B., Wilken, R., Kennedy, J., Arnold, M., & Gibbs, M. (2016). Methodological and ethical concerns associated with digital ethnography in domestic environments: Participant burden and burdensome technologies. In D. Warr, M. Guillemin, S. Cox & J. Waycott (Eds.), *Ethics and visual research methods* (pp. 45–59). doi:10.1057/978-1-137-54305-9_4

Nardi, B. (2010). *My life as a Night Elf Priest: An anthropological account of World of Warcraft*. https://www.jstor.org/stable/j.ctvndv9nw

National Association for the Education of Young Children (NAEYC) and Fred Rogers Center for Early Learning and Children's Media. (2012). *Technology and interactive media as tools in early childhood programs serving children from birth through age 8.* https://www.naeyc.org/sites/default/files/globally-shared/downloads/PDFs/resources/topics/PS_technology_WEB.pdf

National Health and Medical Research Council. (2018). *National statement on ethical conduct in human research*. https://www.nhmrc.gov.au/about-us/publications/national-statement-ethical-conduct-human-research-2007-updated-2018

Palmer, S. (2016). *Toxic childhood: How the modern world is damaging our children and what we can do about it* (2nd ed.). The Orion Publishing Group.

Piaget, J. (1999). *Play, dreams and imitation in childhood*. Routledge.

Podolskiy, A. I. (2012). Zone of proximal development. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning* (p. 210). https://www.springer.com/gp/book/9781441914279

Potter, J., & McDougall, J. (2017). *Digital media, culture & education: Theorising third space literacies*. doi:10.1057/978-1-137-55315-7

Reich, S. M., Black, R. W., & Korobkova, K. (2014). Connections and communities in virtual worlds designed for children. *Journal of Community Psychology*, *42*(3), 255–267. doi:10.1002/jcop.21608

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. Oxford University Press.

Sarachan, J. (2013). Exploring the online playground: Understanding motivation in children's virtual worlds. *Journal of Gaming & Virtual Worlds*, *5*(3), 251–269. doi:10.1386/jgvw.5.3.251_1

Savin-Baden, M., & Tombs, G. (2017). *Research methods for education in the digital age*. Bloomsbury Academic.

Schamroth Abrams, S. (2016). Emotionally crafted experiences: Layering literacies in Minecraft. *The Reading Teacher*, *70*(4), 501–506. doi:10.1002/trtr.1515

Schwandt, T. A. (1998). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative research: Theories and issues* (pp. 221–259). SAGE Publications.

Sergi, K., Gatewood Jr., R., Elder, A., & Xu, J. (2017). Parental perspectives on children's use of portable digital devices. *Behaviour & Information Technology*, *36*(11), 1148–1161. doi:10.1080/0144929X.2017.1360941

Shamir, A., & Korat, O. (2013). *Technology as a support for literacy achievements for children at risk.* doi:10.1007/978-94-007-5119-4

Silverman, S. K. (2011). Zone of proximal development. In S. Goldstein & J. A. Naglieri (Eds.), *Encyclopedia of child behavior and development* (p. 1590). doi:10.1007/978-0-387-79061-9

Singer, D. G., & Singer, J. L. (2005). *Imagination and play in the electronic age.* https://www.jstor.org/stable/j.ctvjhzqb8

Smahelova, M., Juhová, D., Cermak, I., & Smahel, D. (2017). Mediation of young children's digital technology use: The parents' perspective. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, *11*(3), Article 4. doi:10.5817/CP2017-3-4

Squire, K. D., & Steinkuehler, C. (2017). The problem with screen time. *Teachers College Record*, *119*(12), 1–24. https://www.tcrecord.org/content.asp?contentid=22163

Standlee, A. (2017). Digital ethnography and youth culture: Methodological techniques and ethical dilemmas. *Sociological Studies of Children and Youth*, *22*, 325–348. doi:10.1108/S1537-466120180000022015

State Government of Victoria. (2019). *Learning through gaming: Minecraft Education Edition at school.* https://www.education.vic.gov.au/about/news/Pages/stories/2018/stories-minecraft.aspx

Stephen, C., Edwards, S., & European Early Childhood Education Research Association. (2018). *Young children playing and learning in a digital age: A cultural and critical perspective.* Routledge.

Straker, L., Zabatiero, J., Danby, S., Thorpe, K., & Edwards, S. (2018). Conflicting guidelines on young children's screen time and use of digital technology create policy and practice dilemmas. *The Journal of Pediatrics*, *202*, 300–303. doi:10.1016/j.jpeds.2018.07.019

Tarasuik, J., & Kaufman, J. (2017). When and why parents involve young children in video communication. *Journal of Children and Media*, *11*(1), 88–106. doi:10.1080/17482798.2016.1233124

Van Petegem, S., de Ferrerre, E., Soenens, B., van Rooij, A. J., & Van Loo, J. (2019). Parents' degree and style of restrictive mediation of young children's digital gaming: Associations with parental attitudes and perceived child adjustment. *Journal of Child and Family Studies*, *28*, 1379–1391. doi:10.1007/s10826-019-01368-x

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Vygotsky, L. S. (1986). *Thought and language.* The Massachusetts Institute of Technology.

Vygotsky, L. S. (1998a). The problem of age. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky: Vol. 5. Child psychology* (pp. 187–205). Plenum Press.

Vygotsky, L. S. (1998b). The crisis at age seven. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky: Vol. 5. Child psychology* (pp. 289–296). Plenum Press.

Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian & East European Psychology*, *42*(1), 7–97. doi:10.1080/10610405.2004.11059210

Vygotsky, L. S. (2016). Play and its role in the mental development of the child. *International Research in Early Childhood Education*, *7*(2), 3–25. doi:10.4225/ 03/584fa3ec1610d

Vygotsky, L. S. (2019). The general laws of child psychological development. In M. Fleer, E. Kravtsova & N. Veresov (Series Eds.), *L. S. Vygotsky's pedological works: Vol. 1. Foundations of pedology* (pp. 85–103). https://www.springer.com/gp/book/9789811505270

Waters, P., & Waite, S. (2016). Toward an ecological approach to ethics in visual research methods with children. In D. Warr, M. Guillemin, S. Cox & J. Waycott (Eds.), *Ethics and visual research methods* (pp. 112–127). doi:10.1057/978-1-137-54305-9_9

Willis, J. W. (2007). *Foundations of qualitative research: Interpretive and critical approaches.* doi:10.4135/9781452230108

Wohlwend, K. E., Vander Zanden, S., Husbye, N. E., & Kuby, C. R. (2011). Navigating discourses in place in the world of Webkinz. *Journal of Early Childhood Literacy, 11*(2), 141–163. doi:10.1177/1468798411401862

Yarosh, S., Inkpen, K. M., & Brush, A. J. B. (2010). Video playdate: Toward free play across distance. *CHI '10: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, USA, 2,* 1251–1260. doi:10.1145/1753326.1753514

Yin, R. K. (2014). *Case study research: Designs and methods* (5th ed.). Sage Publications Inc.

Zabatiero, J., Straker, L., Mantilla, A., Edwards, S., & Danby, S. (2018). Young children and digital technology: Australian early childhood education and care sector adults' perspectives. *Australasian Journal of Early Childhood, 43*(2), 14–22. doi:10.23965/AJEC.43.2.02

Appendices

Appendix A

Advertisement

Does your child enjoy playing Minecraft while video chatting with a friend using Facetime or Skype when they are in their own separate home settings?

Researchers at the Australian Catholic University are interested in finding out more about this digital form of play. If you live in the XXXX area, and have a child aged 7- to 8-years-old who may be interested in participating in this research, please contact Jane at 891020B@myacu.edu.au to receive further information.

Appendix B

Participant Information Letter

ACU INSTITUTE FOR LEARNING SCIENCES & TEACHER EDUCATION

PARTICIPANT INFORMATION LETTER

PROJECT TITLE: Play as a leading activity for children in a digitally-mediated environment in the home setting
APPLICATION NUMBER: 2019-203H
PRINCIPAL INVESTIGATOR: Dr Karen McLean
CO-SUPERVISOR: Prof. Susan Edwards
STUDENT RESEARCHER: Ms Jane Caughey
STUDENT'S DEGREE: Master of Education (Research)

Dear Participant,

You are invited to participate in the research project described below.

What is the project about?
The project investigates what play looks like when 7- to 8-year-old children, located in separate home settings, engage as avatars in the same virtual world (e.g., *Minecraft*) using video communication tools (e.g., *FaceTime* or *Skype*) to facilitate their gameplay. This project aims to provide new knowledge about contemporary forms of children's online play practices using networked digital technologies in the home.

Who is undertaking the project?
This project is being conducted by Ms Jane Caughey and will form the basis for the degree of Master of Education (Research) at Australian Catholic University under the supervision of Dr Karen McLean. Dr Karen McLean is a researcher in the Early Childhood Futures Research Program at the Institute for Learning Sciences and Teacher Education at Australian Catholic University and has an established research program in early years research. Jane Caughey holds a Diploma of Teaching (Primary), Bachelor of Education (4th Year), and Graduate Diploma of Education (Computers in Education). She has prior experience as a primary school teacher (1992 - 2004), an Educational Consultant (2004 - 2019), and a research assistant visiting playgroups in regional Victoria (2018 - 2019).

Are there any risks associated with participating in this project?
This research investigates children's online play practices in the home setting. If children experience any distress or embarrassment when being observed by the researcher, observations will be paused immediately, and home visits rescheduled or cancelled. Similarly, parents and children have the option not to provide any information if they experience any discomfort when asked to reflect on online play practices during the interviews.

What will I be asked to do?
The researcher will visit your home once a week over a four-week period. Taking part in the research will involve:

- Allowing the researcher to observe my child playing as an avatar in a virtual world whilst using a video communication tool to facilitate the gameplay for approximately 30 minutes each week for a two-week period;
- Allowing the researcher to record written observations of my child playing as an avatar whilst using a video communication tool, which will be used to identify children's activities and interactions during play;
- Allowing the researcher to video record my child playing as an avatar whilst using a video communication tool, which will be used to identify children's activities and interactions during play;
- My child participating in two 10-minute audio-recorded individual interviews with the researcher at the beginning of home visits three and four to reflect on his/her video recorded play episode from the previous home visit;
- Participating in a 15-minute audio-recorded interview with the researcher at the end of home visit four to share information about my child's online play practices.

How much time will the project take?
The observations of children's online play practices in the home will take approximately 30 minutes for each visit and will occur on the second and third home visits. Participation will involve the researcher conducting two interviews with your child at the beginning of the third and fourth home visits which will take approximately 10 minutes each. Participation will also involve a parent interview with you at the end of the fourth visit which will take approximately 15 minutes.

What are the benefits of the research project?
This research aims to contribute new knowledge about contemporary forms of children's play using networked digital technologies. Parents will benefit from a raised awareness of their children's play practices with networked digital technologies in the home.

Can I withdraw from the study?
Participation in this study is completely voluntary. You are not under any obligation to participate. If you agree to participate, you can withdraw from the study at any time without adverse consequences by contacting the Chief Investigator using the contact details provided below. If you withdraw from the study, all your data will be destroyed (i.e., video recordings from observations and audio recordings from interviews will be deleted from all devices and any written documentation will be destroyed using confidential document bins).

Will anyone else know the results of the project?
The study will be reported as a thesis for a Master's degree which may lead to publication in educational journals. Confidentiality will be maintained through the use of pseudonyms for the child participants, their avatars, and their parents. This means that in publications arising from the research you, your child and his/her avatar will not be identifiable. Visual footage from video recordings will only be used by the researcher for describing children's activities and interactions during online play and will not be published. Video recordings and audio recordings will be deleted from the electronic devices after data collection is completed.

Will I be able to find out the results of the project?
An individual letter summarising the results of the research will be sent to you at the completion of the research.

Who do I contact if I have questions about the project?
For any further information, please contact Dr Karen McLean via e-mail at karen.mclean@acu.edu.au or by phone at 03 5336 5420.

What if I have a complaint or any concerns?
The study has been reviewed by the Human Research Ethics Committee at Australian Catholic University (review number 2019-203H). If you have any complaints or concerns about the conduct of the project, you may write to the Manager of the Human Research Ethics and Integrity Committee care of the Office of the Deputy Vice Chancellor (Research).

Manager, Ethics and Integrity
c/o Office of the Deputy Vice Chancellor (Research)
Australian Catholic University, North Sydney Campus
PO Box 968, NORTH SYDNEY, NSW 2059
Ph.: 02 9739 2519 Fax: 02 9739 2870
Email: resethics.manager@acu.edu.au

Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

I want to participate! How do I sign up?
If you wish to give consent to participate in this project, you should complete and sign both copies of the attached consent form and the attached child's assent form and return to Jane Caughey.

Yours sincerely,

[redacted] [redacted]

Dr Karen McLean Professor Susan Edwards

Appendix C

Parent Consent Form

CONSENT FORM

TITLE OF PROJECT: Play as a leading activity for children in a digitally-mediated environment in the home setting

APPLICATION NUMBER: 2019-203H

PRINCIPAL INVESTIGATOR: Dr Karen McLean

CO-SUPERVISOR: Prof. Susan Edwards

STUDENT RESEARCHER: Ms Jane Caughey

I ..... *(the participant)* have read (*or, where appropriate, have had read to me)* and understood the information provided in the Letter to Participants. Any questions I have asked have been answered to my satisfaction.

I agree to participate in this project which will involve (please tick):

☐ allowing the researcher to observe my child playing as an avatar in a virtual world whilst using a video communication tool to facilitate the gameplay for approximately 30 minutes each week for a two-week period;

☐ allowing the researcher to record written observations of my child playing as an avatar whilst using a video communication tool to facilitate the gameplay for approximately 30 minutes each week for a two-week period;

☐ allowing the researcher to video record my child playing as an avatar whilst using a video communication tool to facilitate the gameplay for approximately 30 minutes each week for a two-week period;

☐ my child participating in two 10-minute audio-recorded individual interviews with the researcher at the beginning of home visits three and four to reflect on the video recorded play episode from the previous home visit;

☐ participating in a 15-minute audio-recorded interview with the researcher at the end of home visit four to share information about my child's online play practices.

I understand that findings from this research will be published in journals and presented at conferences about early childhood education. My confidentiality will be maintained through the use of pseudonyms for myself, my child, and my child's avatar.

The pseudonym I select for myself is: …….. (Please choose a name that cannot be connected to you).

I understand that if my child experiences any distress or embarrassment when being observed by the researcher, observations will be paused immediately, and home visits rescheduled or cancelled. My child and I have the option not to provide any information if we experience any discomfort when asked to reflect on online play practices during the interviews.

I realise that I can withdraw my consent at any time without adverse consequences by contacting the Principal Investigator, Dr Karen McLean, using the contact details provided on the information letter for this study or discussing my decision directly with any research team member. If I withdraw from the study all of my data will be destroyed (i.e., video recordings from observations and audio recordings from interviews will be deleted from all devices and any written documentation will be destroyed using confidential document bins.)

Child's name: ……..

Your relationship to the child: ……

NAME OF PARENT: ……

SIGNATURE: …… DATE: ……

<u>Preferred contact details:</u>

Contact phone: ……

E-mail: ……

SIGNATURE OF PRINCIPAL INVESTIGATOR: [redacted] DATE: 23/01/2020

(and)

SIGNATURE OF CO-SUPERVISOR: [redacted] DATE: 23/01/2020

(and)

SIGNATURE OF STUDENT RESEARCHER: [redacted] DATE: 23/01/2020

Appendix D

Child Assent Form

ACU INSTITUTE FOR LEARNING SCIENCES & TEACHER EDUCATION

Child Assent Form

Hello. My name is Jane and I work at a university. I am finding out about how children play together as avatars while they video chat. I want to know if you would like to help me learn more about this.

Please circle "yes" or "no" after each sentence:

It is OK for Jane to visit my home twice to watch my friend and I playing together as avatars while we video chat.

YES NO

It is OK for Jane to visit my home twice to video record my friend and I playing together as avatars while we video chat.

YES NO

It is OK for Jane to visit my home twice to record my voice while I talk about playing as an avatar with my friend while we video chat.

YES NO

Jane will write about how you and your friend play together as avatars using video chat in books and presentations. She won't use your real name or your avatar's real name. Please choose other names you would like her to use:

……..…… ……..……

(My pretend name – not my real name!) (My avatar's pretend name – not its real name!)

MY FULL (REAL) NAME IS: ……...……

THANK YOU!

Appendix E

E-mail Response Script

Dear _____,

Thank you for your interest in this research about children's play using virtual worlds and video chat. Please find attached an information letter which provides further information about this research, parent consent forms and a child assent form identifying what this research involves for you and your child.

If this research is of interest to you, please contact me via email or phone and we will arrange to meet in a public space to discuss your involvement in this research further. My contact phone number is XXXX.

Please feel free to contact me should you have any further questions about this research. I look forward to hearing from you.

Kind regards,

Jane Caughey
Student Researcher

Appendix F

Observational Protocol

Child's pseudonym: _____

Date: _____ Visit: ___ Time: _____

Topic of play	**Content of play**	**Researcher Notes**
What real-life situation is being reproduced?	*How are children reproducing activities and interactions reflective of the topic?*	*Context-specific details during play*
Researcher reflections: *Relevant context-specific details recorded after leaving the research setting*		

Appendix G

Interview Schedule

Child participant interviews

Sample questions include:

- *Can you tell me what is happening here?*
- *What are your avatars doing here?*
- *Where did you get the idea for this?*
- *Why is your avatar doing this?*
- *What happened when you tried this?*

Parent interviews

Sample questions include:

- *Can you tell me about how your child first started using networked digital technologies in your home?*
- *What prompted your child to start playing in virtual worlds with a friend using video chat?*
- *Suppose video chat wasn't available for your child to access. How do you think his/her virtual world play experience would be different?*
- *What do you think your child enjoys most about playing in virtual worlds via video chat?*
- *Is there anything else you can tell me about what you think about your child playing in virtual worlds with a friend via video chat?*

Appendix H

Record of Child Verbal Assent

RECORD OF CHILD VERBAL ASSENT

TITLE OF PROJECT: Play as a leading activity for children in a digitally-mediated environment in the home setting
APPLICATION NUMBER: 2019-203H
PRINCIPAL INVESTIGATOR: Dr Karen McLean
CO-SUPERVISOR: Prof. Susan Edwards
STUDENT RESEARCHER: Ms Jane Caughey

HOME VISIT 2 Researcher Activities: Written observations, use of a video recording device

My child ..... has given verbal assent today for the researcher to record written observations and use a video recording device to film his/her online play.

NAME OF PARENT: .....

SIGNATURE: .....…… DATE:.....

HOME VISIT 3 Researcher Activities: Interview, written observations, use of a video recording device

My child ..... has given verbal assent today for the researcher to conduct an individual interview with him/her, record written observations, and use a video recording device to film his/her online play.

NAME OF PARENT: .....

SIGNATURE: .....…… DATE:.....

HOME VISIT 4 Researcher Activities: Interview

My child ..... has given verbal assent today for the researcher to conduct an individual interview with him/her.

NAME OF PARENT: .....

SIGNATURE: .....…… DATE:.....

Appendix I

An example of parental guidelines to facilitate online sociodramatic play at home.

Online sociodramatic play for children in separate locations: *A guide for parents*

Sociodramatic play is a traditional form of play where children adopt roles and create imaginary play situations using symbolic actions, objects, and language *(El'Konin, 2005).*

Research suggests preschool and early school age children reap significant psychological benefits such as **development of imagination and memory** by engaging in sociodramatic play with other children *(Vygotsky, 1978).*

Children in separate locations can now engage in sociodramatic play by role-playing as avatars in the same virtual world environment whilst using video chat.

These guidelines will help you facilitate this online form of sociodramatic play in your home:

- ✓ Provide your child access to a digital device (e.g., iPad®) equipped with age-appropriate virtual world software (e.g., Minecraft®) *and* a video communication tool (e.g., FaceTime®). Video chat helps create a sense of co-presence between separately located children and allows them to discuss their in-world play.
- ✓ Encourage your child to use virtual worlds that offer open-ended play opportunities (e.g., Minecraft in *Creative* mode). Avoid virtual world experiences that require children to play games where aim is to 'win' or 'survive' and/or earn in-world currency or rewards.
- ✓ Use school-based virtual world software where possible or make use of parental controls that ensure your child interacts only with friends or relatives they know in the real world.
- ✓ If using publicly accessible virtual worlds, ensure your child is aware of cybersafety practices, such as not disclosing personal information and avoiding interactions with unknown avatars.
- ✓ Help your child learn to use features of the virtual world. Other children (e.g., siblings, friends) and/or teachers might assist with this process.
- ✓ Be flexible when setting screen time limits to allow time for play to evolve.
- ✓ Schedule online play sessions for times that suit your child *and* your child's play partner.
- ✓ Become familiar with how to manage technical issues that might interrupt online interactive play (e.g., restarting software, resetting internet connections).

References:

El'Konin, D. B. (2005). Chapter 1: The subject of our research: The developed form of play. *Journal of Russian & East European Psychology*, *43*(1), 22–48.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.