

# Digital Aesthetics and Multidimensional Play in Early Childhood

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## 1 Children's Encounters with Digital Imagery

This chapter considers the impacts and effects of what is popularly labelled the digital age on early childhood learning. I am particularly interested in the ways digital technologies affect and disrupt well-established conceptions of young children's art and play in education contexts, including the expectations of how art and play is produced in kindergarten spaces.

Certainly, contemporary school children inhabit a world that is intensely visual. Due to the ubiquity of digital technologies across the globe and in everyday lives, young children encounter masses of digitally-based, visual imagery that saturates the contemporary world. Much of that imagery is commercially driven, and increasingly, aimed at them: in the USA young children have become the largest target audience for iTunes applications (apps) (Arita, Seo, Chu, & Quek, 2015; Hernandez, 2014). This suggests that those who purchase digital technologies are prioritizing opportunities for young children to encounter and actively participate in those technologies. Consumers are also becoming more selective as over time they have seen how well young children understand and operate apps. Thus demand has exploded to accommodate a very young consumer base who "are demanding more sophisticated, higher-quality education apps as they become accustomed to gaming apps made for adults" (Hernandez, 2014, para. 7). App developers are keen to quickly grasp and supply the opportunities that this uptrend offers; however they see that going through educators is problematic because "educators criticize edtech companies for producing uninspired products that ignore learning science" (Hernandez, 2014, para. 10). Many companies are now bypassing these consultative processes and marketing their apps directly to parents and families in order to "respond more

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quickly to user behavior ... [and] experiment with new approaches to learning without having to fight through the institutional inertia of 'this is how it's always been done' or 'that will never work'" (Hernandez, 2014, para. 11). It will be interesting to see how these discordances over the educational credibility of apps aimed at the young child market will play out as demand continues to rise and spreads across global communities and cultures.

The cautionary voices of early investigations into the impacts of media on young children (see for example: Buckingham, 2003; Kinder, 1991; New London Group, 1996) warned about the effects on children of exposure to images that were specifically constructed to directly advertise goods and services and indirectly advertise lifestyles and identities. Families and educators became cautious about exposing children and youth to media that influenced their food choices and body-image and fueled a homogenized view of the world. Contemporary popular imagery is less feared (Hernandez, 2014) but far more slippery because it comes in disguise. More than the obvious motivations of advertisements to sell products and idealized lifestyles, contemporary visually-based products such as apps, children's film, and television might be packaged as educational, harmless, and neutral (and might even seem to promote diversity) yet *something* is being virtually sold to children. An extreme example of this disguised marketing is seen in an app that is used to sell ideologies to children living amongst the Islamic State. The app teaches about letters of the alphabet by using weapons, military vehicles and other similar combat-related words and images (Weiss, 2016).

Many of the products being sold to children today are not physical, material goods. The base motivations of games, apps, films and television programs sell ideologies, desires, and aspirations through the building of virtual friendships, virtual families, worlds, pets, lifestyles, identities, subjectivities, and game-based, goal-oriented accomplishments. The collective term for children's participation in online programs is gaming. For young children virtual disguising comes through gaming which requires children to play through avatar characters; examples include the heavily-pixelated human, monster and animal characters in Minecraft®, the archetypal NPCs (Non Player Characters) which populate Terraria®, the humanistic Sims®, and the hybrid creatures of Animal Jam® and Moshie Monsters®.

The pervasiveness of image-based material and the enthusiastic way children engage with digital imagery through these virtual and disguising layerings, as well as the experiences they have through playing with friends, other toys, pets and so on, suggests how contemporary childhoods are lived through messy, intermingling multiple realities and multiple dimensions of the *imaginary*, the *experienced*, and the *actual*. A common scenario: As a seven-year-old my daughter played with building bricks and miniature animal models, swam, rode her bike, played with her friends, drew with pencils and paper, as well as using a decommissioned mobile phone, a tablet and a laptop to play most of the games listed above. All of her play happened in a disorganized fashion and I'm not sure that she separated her play into different dimensions or realities, even though she encountered them through these different materialities. Such differences were of course muddied due to the marketization of popular online games into soft toys, books, clothing, and the marketization

of popular toy characters, children's television programs into online games and apps, puzzles, and books. As a parent I facilitated her exposure to all these play-things, and I chose things because I felt they were deemed appropriate for her. However, my assessment of appropriateness was contingent upon my perceptions of child-appropriate toys rather than only allowing her to play with things that had high pedagogic or educational credentials. I did not undertake a careful mediation of whether each play item provided her with *real* experiences (as in, unless she was physically engaged in fine-motor or gross-motor movements as she played with physical objects, she was not truly playing). I believed that playing with digital media and virtual gaming was just as bone-fide in building her thinking and physical capabilities as sitting down to a tea party with her friends and her toy dinosaurs.

The short description I provide of my daughter's play is a typical example (in a first world context) of how many children experience digital imagery at home, illustrating perhaps the typical, independent choices that are made in facilitating children's exposure to different types of imagery and play. Such choices can be more complicated in early childhood education contexts that are regulated by policies and curriculum requirements<sup>1</sup> as well as the collective beliefs and expectations of attending families.

A kindergarten classroom is often where a child first encounters formal care and education. Kindergarten playrooms, classrooms and outdoor areas have a particular identity: filled with equipment, items and decor that is carefully organized and constructed with reference to governing age-appropriate schema and criteria seen to enhance and optimize a child's learning potential and socialization skills (see Figs. 1 and 2).

A search for images of early learning spaces will pull up rows of snapshots that are almost identical in their organization, with bright color schemes and furniture arranged in such a way to create zones for specific types of play: reading, sand-play, puzzles, painting and more. Wall space is often used as a pedagogic strategy to deliver the curriculum through posters, images and written text. The overall effect is bedazzling: a curation of brightly-colored miniature furniture, toys and surfaces that resemble a cross between a home, playground and toy shop. The rooms take on this spatial conventionality because the choice of what furniture and resources to include is directed by the expectations of parents, education departments, policy makers, teachers, accreditors, and wider society about what a kindergarten room should look like. The education suppliers that kindergartens use respond to these expectations and provide specific examples of equipment and furniture; the result is that kindergarten classrooms take on a uniformity and sameness. The lack of variety in

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<sup>1</sup>Early childhood education is referred to here in the Australian context and represents accredited full day-care centres for children aged 0–5 years, as well as the elementary school classrooms dedicated to children attending their first year of formal schooling. In Australia this first school year is variously named kindergarten (kindy) or preschool (prep), depending on the State or Territory. All Australian schools will eventually drop the terms kindy and prep and adopt the term foundation, to reflect the language of the national Australian Curriculum.



**Fig. 1** Kindergarten room (Image credit: [http://www.thelearningexpresspreschool.com/img/early\\_preschool\\_room\\_2.jpg](http://www.thelearningexpresspreschool.com/img/early_preschool_room_2.jpg))

equipment and furniture is not due to a lack of invention by educators, however, but directed by the specific goals embedded in curriculum and framework documents. Essentially, with the standardizing of policy and curriculum has come a standardization of the learning space and everything in it. Furthermore, with convention can come exclusion; certain toys, objects, images deemed inappropriate are not included in these formulaic room curations. Although it is outside the purposes of this chapter to critique the problems associated with concepts of appropriateness and how what gets included and what remains outside the door, can, and often does, set up homogenizing images of childhood (Giugni, 2012), families and the world, this conventionality is important to discuss in relation to how digital technologies enter the space.

So far I have briefly discussed commonplace incidences of play for the contemporary young child, and I have described fairly typical early education contexts. The chapter will now examine children's digital play more closely, and will focus on specific aspects of that digital play: digital aesthetics, and the multidimensional nature of digital play due to the construction of digital devices.<sup>2</sup> I will refer to data gathered during a small research project to present evidence-based discussion on

<sup>2</sup>In this chapter aesthetics refers to the affective and sensational in art, and multidimensionalities refers to the combination of the physical, digital object coupled with the virtual spaces created by programs and apps seen on-screen.



**Fig. 2** Kindergarten room (Image credit: [http://btckstorage.blob.core.windows.net/site2203/DSC\\_1948.JPG](http://btckstorage.blob.core.windows.net/site2203/DSC_1948.JPG))

digital aesthetics and multidimensional play in order to ignite critical thinking about the ways expectations and valorizations emerge around young children's arts and play practices, particularly in education contexts. I bring a poststructural theoretical orientation to my discussions on aesthetics and multidimensionality, and I pay particular attention to new materialist thinking in these conceptualizations.

## 2 iPads in Kindergartens Project

In 2013 I was part of a small research project that equipped three kindergartens in the area of Greater Brisbane, Australia, each with ten iPads and an iBook computer. The project tested the use of iPads by children aged between 2 and 4 years, and looked specifically at their literacy and creative arts learning on the devices (Dezuanni, Dooley, Gattenhof, & Knight, 2015). The project ran over 1 year, and went in three cycles. In each cycle the kindergarten educators implemented learning activities and also free play with the iPads. Families were also able to take the iPads home for short periods of time to use them. At the end of each cycle we interviewed the educators, families and children about their use and experiences with the iPads.

The project had different interests around the adoption of the iPads by the participants, the main focus being on the development of young children's literacy and creativity practices in formal and home spaces. As is usual with a research team, we

were curious about the outcomes of our project and had no particular agenda to push about putting the devices in the hands of very young children, so we were surprised by the significant interest in the project by major mainstream media outlets in Australia. During interviews we were under pressure to declare a negative moral position on the use of digital devices by the young, and we were regularly probed by interviewers for evidence of the young participants preferring the iPads over playing with toys or other children in the kindergartens. We became aware of the powerful emotions that the public has around introducing digital media such as iPads to the very young and how these emotions seem to circulate around the ethics of exposure (Saslow, 2012), the cognitive impacts on development commonly regarded as naturally occurring (Chang, Rakowsky, & Frost, 2013), social impact (Ward, 2013) and the perceived threat to certain types of play (Weber, 2013).

Clearly, mainstream thinking about play and learning are challenged by the presence of digital technologies in young children's lives. So how is it that digital technologies have managed to pervade early childhood education spaces?

In terms of the iPad, Apple's success has depended upon high-quality marketing and clever brand styling that invokes consumer desire to own Apple devices. Apple initially pitched the iPad at adults as a useful piece of tech gadgetry that filled a perceived space other Apple devices left open. This clever, innovative pitch was extremely fruitful for Apple, producing sales estimated at around 200 million iPads as of June 2014 (Costello, 2014).

The physicality of the iPad, made from "strong, beautiful materials like aluminum and glass" (Sahoo, 2012, p. 39), plus its particular size and weight is what Apple foregrounds in its marketing strategy as a point of difference to other technology devices such as the smartphones and computers the public uses in their daily lives.

It is likely that Apple also foresaw how popular the iPad would be with families. Early on the company featured children/families in their marketing of iPads, simultaneously creating and supplying a burgeoning consumer desire for all family members to be tech-savvy. This is particularly evident in Apple's launch advertisement for one of the later iPad models which features a regular pencil laying on various types of tables to hide the presence of the iPad air, making "an implied signification that the iPad is a device designed for learning by bright young minds" (Knight & Dooley, 2015, p. 47).

The crucial success of the iPad concept and its subsequent marketing was to create an object that was both extremely sophisticated *and* extremely simple to handle and operate. I believe the key aspect that brought it into the hands of young children and then kindergartens and schools was the potent combination of two things: the similar shape and size of the iPad to traditional learning tools (the slate, the book, the notepad) which differentiates it from a computer and gives it different signifying associations; and that it is operated by fingers rather than a keyboard (Hernandez, 2014). This mix of high-tech capacity and low-tech operation allowed the iPad to breach the well-protected wall of the kindergarten room.

So, although the systems of reporting and accrediting that are in place in contemporary kindergartens can, among other things, force the regulation of spaces, equipment, pedagogies, behaviors, and productions, putting iPads in kindergartens subverts the equipment and aesthetic conventions of the kindergarten room. As an

example, the iPads in our small project presented an unanticipated challenge to the habits of surveillance over what children learn and how they learn, and how available that learning is to the adults and education system around them. We regularly observed that children quickly deleted many of their files and photographs they produced on the iPads, much to the alarm and frustration of the kindergarten educators. Digital technologies are tricky then, because children have much more control over their work, and their work is far less visible to an educator than physical objects made with paper, paints, bricks, toys and cardboard.

Nevertheless, and despite these subversions, digital tablet technologies have made it into the kindergarten. Though my chapter departs from the focus of our previous research project into children's uses of iPads, it revisits the data produced during that project to more closely observe the visual material the children created to think about the aesthetics of those digital images, and about multidimensional play. I believe it is important to make observations about digital aesthetics and multidimensional play not only because children now make digital images, but because the technology contained in tablets offer ways of working that are quite different from the technologies of paper, paints and pencils.

It is important too, to develop ways of thinking about children's digitally-produced art so that educators, parents and others can shift from being passive, ill-informed consumers/providers of digital technologies, or passive observers of the art being produced, and instead find ways to actively use digital technologies that support high-quality learning in their kindergartens and homes.

This chapter will use some examples of digital art produced by young children as prompts for discussing aesthetics, and the importance of considering the multidimensionality of digital works. I must assert from the outset however, that this is not a technocratic chapter with tips and steps for making digital art with young children, and neither will the chapter advocate for classifying such work for the purposes of assessment. It will instead provide a critical and theorized engagement with young children's digital art through the concepts of aesthetics and multidimensionality.

### **3 Multidimensionalities and Aesthetics in the Kindergarten**

Kindergartens appear uniformly similar; however the regulations that govern them are schizophrenic, slippery and hard to challenge. Regulations are dualistic; they exert control through the implementation of accreditation checks and measures, which uphold very specific visions of early childhood education, whilst appearing to preserve the kindergarten room as a special space for children; the child's *own place*. Dominant early childhood pedagogical approaches, such as the Reggio Emilia approach (Edwards, Gandini, & Forman, 2011), the Steiner education movement (Childs, 1991), Montessori schooling (Lillard, 1996; Montessori, 1982), and the unschooling approach (Griffith, 2010), form additional, influential sedimentary layers around this regulated/sanctified/slippery/contradictory kindergarten image. Nevertheless, kindergartens are not monolithic, as disruptions, movements and encounters are constantly occurring.

The architectures of the kindergartens in Figs. 1 and 2 illustrate a sanctified space that is heavily regulated and officiated, despite the constant movements and encounters occurring there. Movements and encounters operate on different scales, temporalities and durations, and exude from different materialities; these form the routines and activities that occur daily in early childhood sites (Nxumalo, Pacini-Ketchabaw, & Rowan, 2011; Taylor, Blaise, & Giugni, 2013). Although our small research project ignited an emotional media reaction, introducing iPads into kindergartens was not a violent disruption of an otherwise static, mono-dimensional environment. The iPads were merely a more noticeable presence in this ever-changing cluster of movements and encounters between many different things that were constantly coming and going.

Elizabeth Grosz (2009) declares how, in art, “The plane of composition can be understood as a composite field of all art works, all genres, all types of art, the totality of all the various forms of artistic production, that which is indirectly addressed and transformed through each work of art” (p. 84). Similarly, the kindergarten space forms part of the composite field of the pedagogic exchange, which is indirectly addressed and transformed through each early childhood education event (that is, each moment). Kindergarten sites are pulsing, complex and fluid clusters of happenings that work across dimensionalities and chronologies. Kindergartens are sites with indeterminate *edges*<sup>3</sup> that are constantly constituting and constituted by pasts, futures and presences across “a relational field, where micropolitics occur” (Blaise, 2013, p. 189). Different beliefs, practices and enactments that come to be understood collectively as *early childhood education and care* come into contact, sometimes discordantly. Kindergarten sites, despite the uniformity of their design are multidimensional conduits or spark points of these messy micropolitical movement encounters. Bringing iPads into such a space to encourage very young children to use them freely is one open example of this.

It is possible that the extraordinary public reaction to taking digital technologies into kindergartens is due, in part, to the complex affects that surround the iPad as a material object. These affects seem to intensify when iPads are given to young children, to use without direct instruction and without time constraints. In this chapter I will focus on two of these intense affects: multidimensionalities and digital aesthetics as a way of critically theorizing on digital art and play. In doing so I make the case that digitally-based creating is not so different from the more familiar ways play and art occurs in the kindergarten room. Although digital technologies do appear to trouble hierarchies of appropriateness of carefully protected and carefully curated processes and materials (such as cardboard boxes, building bricks, paintbrushes, sculpting dough and more), the work produced by the young children during the iPad project demonstrated that children do learn about aspects such as dimensions and aesthetics as effectively as they do when using traditional materials.

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<sup>3</sup>Although a kindergarten is usually a built structure such as a classroom or a center, the activities, people, staff, equipment come and go in and out, thus the edges of a kindergarten are not absolute but are permeable.



A focus on the ways multidimensionality and digital aesthetics are foregrounded in digital arts can advocate for the educative benefits of using digital media with young children, and begin as well to soothe some of the apprehensions around the consequences of *messing with* the well-established, well-tested programming and pedagogic habits that have directed young children's art and play experiences for such a long time. Dimensionality and aesthetics are important in the development of children's conceptual and perceptual skills. Bringing digital technologies into the kindergarten space might seem to taint the sanctity of the child's own kindergarten room, even though kindergartens are not designed and curated by children, but are always mediated and controlled.

### 3.1 *Multidimensionalities*

The iPad is a solid object with design specifications that make it highly recognizable. It is also a multidimensional object, with space beneath/within/elsewhere because it *contains* the virtual spaces of the drive, storage areas in apps, cloud-based storage space as well as becoming spaces: the spaces that begin in chaos and are transferred to the iPad as photographic images, virtual environments in games, and the created images in art-based apps. The virtual spaces of things, places, events, and their transferences across domains and dimensions are encountered via a specific view space, as movements on a static surface, through animations, shifts, and alterations ignited by the touch of a finger on a sheet of glass. These multidimensionalities are constantly becoming without beginning or end, continuous and productive, producing, becoming without need of human action (multidimensional spaces continue to *move*, even when the iPad is set to off). These are perpetuating and perpetual, multiple dimensionalities that are reliant on as well as independent from human control.

iPads and tablets are computers, and though they respond to touch they also operate through a form of legislated imagination (Deleuze, 2004, p. 57), a digital, binary coding that translates across activities and that offers creative possibilities, but within the bounds of the coding parameters. Codings are produced by the pressured touch of skin on glass. What is possible stems from this exchange between the touch of skin, the glass surface, and the coding patterns, not unlike the parameters set by the dimensions of the sheet of paper, the crayon, the building brick. Grosz (2009) states, "The common ground for all the arts is the rhythmic, durational, universe of invisible, inaudible forces, whose order can only be chaotic" (p. 89). Art occurs through translations, beyond the material, no matter what that material is, because the material is always bound by its own eventual parameters. In digital media, art emerges from touch to binary coding, to image, occurring through a series of effecting, mediating translations and layerings that are simultaneously material and multidimensional.

How might this be thought about in relation to the art young children create with paper, pencils and paint? Grosz (2009) hints at a way of thinking about this when

she declares that art “forces do not reveal themselves to lived bodies except through the processes of composition ...they are fundamentally unlivable” (p. 89). Paint, paper and pencils are no more alive than the iPad because pencils, paper, paints, and clay, for example, each have mediating, restrictive possibilities, as does an iPad. Paper, crayons, paints, and clay have just come to be accepted through various early childhood art discourses through valorizations that declare them *age-appropriate* and unrestricted, educational, somehow neutral or raw. This view is seen in instructional early childhood education texts which commonly partner best practice, high-quality play, and the nurturing of creativity with particular equipment, including “intelligent materials ...that invite questions, curiosity and experimentation” (Krechevsky, 2001, p. 252), and “high-quality art materials ...that real artists use” (Bruehl, 2011, p. 21). Collectively, the instructional texts that early childhood educators encounter through their studies and professional career set up norms about what equipment will best aid children’s learning in particular ways, and at particular stages of their development.

By contrast, and ironically (due to popular, negative beliefs about children and technology), digital technologies can break free of their physical dimensions due to their rhizomatic connectivity with imaginations, programmers, and power sources that keep them running and that keep apps lively, maintain coding activity, and that ensure updates download and more. Boundaries between the edges of the device are broken down so that worlds within, around, and across, merge and blur. The iPad object becomes bodiless because its contents are not exactly contained within its physical dimensions. Edges between the iPad object and the bodies that use it disappear as device and body travel and build around/through/with/of them. And because “the arts share, not a common past but a shared future ...to capture the force of time, opening up sensation to the future” (Grosz, 2009, p. 89) the valorizations around early childhood arts that sanction the permissions for inclusion of certain materials in the kindergarten should be extended to include digital devices as an additional material that can come to life through the plane of composition. The iPad offers aids to learning as much as the paints, easels, and clay that are often present.

### 3.2 *Aesthetics*

Aesthetics is hard to articulate, classify or simplify because the affective drive to create and respond to art “comes not from a uniquely human sensibility, not from reason, recognition, intelligence, nor from man’s higher accomplishments, but from something excessive, unpredictable, lowly and animal” (Grosz, 2009, p. 82). Grosz points out that the intense affects and urges that result in art production also produce intensities, sensations and affects that go on to prompt further art production “composed of blocks of materiality-sensation” that “monumentalize ...only sensations” (Grosz, 2009, p. 84). Intensities and affects, rather than classified elements, are the ways aesthetics are cyclically formulated and reformulated, formulate and reformulate. The making of art is driven by a desire to make something pleasing, and the

pleasure presents a feeling to make further art, and this drives a desire to make something pleasing, and so on. This chapter works with Grosz's notion of art and aesthetics as monumentalized clusters of materials, sensations and affects and how these emerge in art made by young children with digital technologies. Conceiving art not as an object but *through* sensation—"not sensations of a subject, but sensation in itself, sensation as eternal, as monument" (Grosz, 2009, p. 84)—presents an aesthetics free from a narrow practice of looking and its tethering to categorization, emotion and traditional conceptions of beauty. Aesthetics through sensation "is not representation, sign, symbol, but force, energy, rhythm" (Grosz, 2009, p. 85) brought about through art no matter what the materials, or the age of the artist. A sensation(al) aesthetics hones in on the positive tensions that occur as thoughts, movements and materials meet, this shifts right away from a schema-driven, developmental understanding of why and how young children make, read, and appraise, their art.

This chapter does not attempt to establish an aesthetic canon for young children's digital art making but considers instead how digital technologies formulate and reformulate affects and sensations, and how that gets noticed rather than the capacity of the technological object itself. "Every art form has a significant part to play; nevertheless, aesthetics percolates each form of the visual arts ... arts are the characteristic ways in which aesthetic experiences ... shall be fostered" (Stavridi, 2015, p. 2275). The physical dimensions and sanitized glass surface of digital tablets might seem to mediate or restrict the sensations children experience when making art with physical materials, but this is if art making is thought about through the particular determinations of physically handling and wielding a paintbrush, paper, clay, tape, scissors etc. established by dominant, mainstream early childhood art theories. There is something curious about digital art making because it has to go through a series of translations determined by the parameters of the programming, and the role of binary coding in making *touch* turn into something else. Grosz's notion of aesthetics as monumentalized clusters of materials, sensations and affects is still taking place in the making of art on a tablet. They might be unfamiliar clusterings of ideas, decisions, constructions, mark-making usually seen in early childhood art and play because beyond the tablet no physical materials are used, but the images shown in our small project clearly showed evidence of affective and sensational decisions and responses.

## 4 Digital Art and Play

The three kindergarten sites that participated in the iPads project were open to experimenting with the effects and impacts the iPads would have on children's play habits, art-making habits, and their own programming and pedagogic habits. The specifics of that project are reported elsewhere (Dezuanni et al., 2015) and deal with our focus on children's literacy and creativity development. The children in this project experimented with a range of apps as well as the standard iPad features and created many pieces of work, which we spoke about in particular ways at the

conclusion of that project. The data generated by the project continues to provide excellent opportunity to think about the ways digital technologies are taken up in early childhood education contexts, or conversely, why they might be resisted. In what follows, I use some of the data from this small project to theorize about children's interactions with digital technologies, and to consider how digital aesthetics and multidimensional play became part of the daily routine of these children as they worked with iPads.

I have suggested that early childhood sites are not fixed but that they are instead shifting, multi-dimensional clusters, and that art and play are part of these movements no matter the type of materials being used. I have taken a closer examination of these movements by focusing on concepts of multidimensionality and aesthetics, and how in particular digital technologies might offer ways of thinking about multidimensionality and aesthetics that disrupt conventionalized beliefs and practices about art and play in early childhood.

Throughout this chapter I have resisted using standard or Modernist conceptions of aesthetics that hone in on the "awareness of line, form, design and their dynamics" (Stavridi, 2015, p. 2275); elemental terms that work on a premise of the art as a separate object to be dissected and tethered to fixed interpretations and representations, and the young child as a certain type of drawer, painter, constructor, etc. I provide examples of four art works produced by children during the iPad study. Instead, my commentary on the children's works will consider aesthetics and multidimensionalities, not as resident in work-as-separated object but through the wider clusters of sensations, affects, rhythms and forces that they are part of. For that reason the images will not be discussed separately as this would attempt to establish them as objects separated from the mass of things that were occurring as they were being created (Figs. 3, 4, 5, and 6).

The examples illustrate the multidimensionalities that occur when hands, binary coding, app parameters, camera lenses, interiors and exteriors, objects, effects, and the materials of an iPad collide in various agglomerative arrangements. These are not held in the image frame but share in the wider event that the image is part of. Other types of imagery such as paintings, drawings, and the scratched-marks made in the dirt with a stick also work this way, emerging from different and differing clusterings of affect, materiality, temporality, physicality and sensation. Differences and valorizations attached to particular practices are less marked when art making and play are thought of as emerging through multidimensional acts, thoughts, movements and encounterings already occurring in the kindergarten.

The aesthetics of these images are sensational, vibrant, productive. Aesthetics are reformulated and reformulating as taps, swipes, clicks, reflections, and programing result in effects and sensational formulations in intense loops and repetitions. Things can happen quickly. Likewise, they can be rejected without a second thought.

Many adults remain reticent about making digital media freely available to very young children while they are attending kindergarten. In addition to the reasons discussed in this chapter are concerns about negative effects on a child's posture, eyesight, socialization skills and the motor skills needed to correctly grip a pencil for writing (Starke, 2013). Such fears are less about the specifics of young children



**Fig. 3** Collections of contrasts, taken from a low angle



**Fig. 4** Digitally drawing onto the photograph of a painting created on the reverse side of building plans, saved as an image



**Fig. 5** Collections of shapes clustered together

using a tablet computer and more about the conflicted feelings educators might be having about whether to introduce digital technologies or resist the change. Digital technologies are complex objects of desire. Educators can feel uncertain of where it all might lead and what might eventuate when young children are able to access technologies, even though many children already have this access in their homes.

The images that appear in popular media that feature young children sitting hunched and solitary in front of a computer were not enacted in our small project. Children came and went from the iPad table. They shared, collaborated and helped each other to solve problems and understand instructions. None of the children were readers so they had learnt to use apps by trial and repetition. We saw children treat the iPads carefully when they took them outside to take photographs, and we witnessed how they quickly figured out how to hold their hand in a particular pose so that only their finger touched the glass surface, showing how the particularities of digital technologies impart responsive human technologies.

The digital arts examples included here serve to enrich straightforward, emblematic notions of the arts and play that are produced in kindergarten spaces. The examples were chosen because they show the ways children, through operating the iPads through



**Fig. 6** Different pressures and finger movements to explore line effects and colors

flicks, swipes and presses with their fingers and hands desired to make something pleasing, and that this desire prompted further experimentation with the devices. Their active persistence in learning how to use the iPad functions to create their artworks challenges perspectives of appropriateness around young children’s art and play.

The iPads did not dominate the children’s art and play: we did not see children turn away from making art with low-tech materials. The images demonstrate how children found ways to work with digital media as well as more commonplace materials in ways that did not centralize either process. The iPads added to the art and play equipment available, but in ways that somewhat disrupted regular and regulated artmaking, pedagogy, documentation, corporeal activity and interactions. Rather than this difference raise suspicion, however, as more children are exposed to digital technologies in their homes, kindergartens have an important opportunity to help children use digital technologies in stimulating ways in their art and play.

## 5 Conclusions and Impact

The presence of digital technologies such as tablet devices in kindergarten rooms adds different multidimensionalities to play, as the capabilities of apps and programs can enhance what children can do with other resources available in the learning space (Geist, 2014). Introducing digital technologies for art and play learning requires active pedagogical strategies and a philosophical shift away from historic

notions of early childhood arts education that are fixed to developmental understanding of children's art practices, what the art experience should provide to children and how art connects to the world before those complex and multidimensional visual aspects can be brought in to the kindergarten.

Observations of children's use of drawing and writing on iPads made during the small study described here have generated new theorizations of young children's use of digital technology and the actions, reactions, and desires of very young children as they create their digitally-generated productions, as well as the activity/conceptual legislations the iPad instigates through its materiality. What has emerged through the drawing and writing work produced by children, and the feedback provided by parents, educators and children is that a child's drawing and writing skills are not tied to particular material objects or procedures. Different assemblages of objects, including paper, pencils, iPads, fingers, glass, and binary coding collectively and complementarily nurture the gross and fine motor skills needed for writing and drawing development. Our observations of children using their index fingers adeptly across the glass screen showed how children develop their fine and gross motor skills for all kinds of purposes: this is particularly needed for children living in a digital age.

The arrival of digital technologies in the kindergarten space calls for shifts in conventionalized concepts about early childhood arts practices, materialities, and aesthetics (Sakr, Connelly, & Wild, 2016; Stavridi, 2015) and expansive thinking about the operative modes of digital devices. Using adult-targeted art making apps instead of those designed specifically for young children, for example, will help mitigate against children performing mundane, formulaic, template-based tasks instead of creating their own compositions and images. The paper-based artifacts and scripts that young children produce have large amounts of sentiment attached to them. However, this isn't really connected to the value of the work but more so to a sentimentality brought about by signs that include jumbled up letters, misspelt words, innocent statements, and also line drawings, brightly colored paintings, and so on. These valorizations might suggest that paper-based work is more beneficial (in terms of its educational value) to a child than a digital image. Perhaps one reason for the negativity around iPads has to do with conventional notions of authenticity and the *real-ness* of learning processes young children ought to experience and navigate. The children's use of iPads prompts thinking about the norms and conventions around children's development and growth, as well as the process of becoming school-ready (Lynch & Redpath, 2012) in early childhood education and care. And further still, the ways in which the expectations that educators, parents and caregivers have about drawing and writing milestones are often informed and shaped by systemic theories and policies intended to *streamline* and *conventionalize* children's development in art and play.

Young children's digital art and play productions can make highly relevant connections to their visually saturated life; however this will be missed without critical and theorized thinking about the content of the task, the development by educators of a philosophical stance on the arts in early childhood, and critical pedagogic practices. Arts and play can provide opportunities for educators and even young children



to critique the social, commercial, the mundane, the conventional. And that also presents occasions to discuss, engage and produce responses that are complex, multidimensional, and creative. Without critique, theorizing and engagement, conventional conceptualizations of arts education persist as do the curricular and pedagogic governances which affect it. Digital technologies can be a confounding and contradictory early childhood resource; they are clearly able to offer activities that children are very motivated to work on, and they are increasingly owned by families, meaning children access them at home. However because of their multidimensionality it isn't always clear how digital technologies such as iPads perform many of the legislations of policy and curriculum beyond technology education (Sakr et al., 2016, p. 129). Despite their attraction as futuristic and *cutting-edge*, they can be allocated for very specific curriculum tasks, or used merely as sources for entertainment.

I don't advocate for educators micro-managing how young children play and create art on digital technologies; however it is important that educators acknowledge that digital technologies provide young children with particular opportunities for playmaking and for art making that complement other materials commonly found in a kindergarten. Closer observation of children's digital play and art making by educators may help to shrink material distinctions between digital tablets as *technological equipment*, and dress-ups, building blocks, easels as *normal early childhood equipment*.

This is an exciting time for early childhood play and art making, and how young children's learning might be aided by digital technologies. It may seem that studio-based approaches such as painting, clay, construction, etc., are under threat by the arrival of digital technologies (Stavridi, 2015); however our small study showed no evidence of this. My aim with this chapter has not been to argue the virtues of any particular art practice over another, but instead to critically and theoretically examine the aesthetics and dimensionalities of digital art produced by the very young and to consider more closely how these aesthetics and dimensionalities contribute to the learning and activity of the kindergarten space.

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