
Digital Natives Come to Preschool: implications for early childhood practice

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ABSTRACT This article explores the implications of young learners' dispositions towards the use of digital technologies in contemporary early childhood settings. It is proposed that young learners have grown up in very different social conditions from previous generations, mainly through the saturation of digital technologies, in particular computers. This creates very different learners than previous generations. When educators fail to recognize such differences, there is potential for gaps in learning. This is particularly the case when equity dimensions are considered. It is proposed that early childhood settings need to reconceptualize pedagogy and learning opportunities for the new generation of learners. Drawing on Bourdieu's theoretical project, it is proposed that young learners come to early childhood settings with a digital habitus, which is differentially constructed in the home environment and needs to be considered in early childhood practice.

Within the current literature on young people, there is a growing recognition of the impact of computers in the social world, and the ramifications of such technology on shaping learning, dispositions and attitudes of new generations. Unlike any time in history, the rapid expansion of technology into the worlds of young people has resulted in the development of a new generation quite apart from previous generations. This generation has many names including Millennials, Nexters, Generation Y and Generation Why. While the names may vary, the identification of this group of people as being different from other generations stems from their unique exposure to digital technologies. This is the generation that has grown up in a society immersed in technology. They know the Internet, computers and other digital tools like no other generation. For them, technology has been an integral part of their social life. Juxtapose their experiences with those who work with them and there is the potential for the collision of two worlds – that of the technology-rich with that of the technology-poor. When this is considered within the context of early childhood settings, it becomes apparent that many of the views traditionally held in this sector come under challenge. This article explores the insertion of the 'digital native' in the context of early childhood settings and the implications of such insertions for practice. It is argued that there is an urgent need for concepts of play – an integral part of the early childhood ethos – to be reconceptualized so as to incorporate notions of digital play in order to sustain and support the habitus of the children now entering the range of early childhood services.

Who and What Are 'Digital Natives'?

There is a considerable literature on generational differences. This literature addresses various transitory generations which are brought about through various social conditions; for example, baby boomers, who were raised in the relatively secure conditions of the post-Second World War where economic stability was the norm. In reaction to their parents' obsession to look after monetary resources (in part due to their harsh economic experiences of depressions and wars), the baby boomers are a generation of excesses where there is a strong ethos to 'live to work' in order

to purchase and provide for their offspring (Mackay, 1997). Their children have responded to changing work relations where stable employment is not the norm, and where they object to their parents' absence from the home (Mackay, 1997). This next generation, Generation X, has developed different dispositions than their parents in relation to work, family and consumption. Baby boomers are generally seen to be those people born just after the Second World War (1945) until approximately 1965. Generation X is those people born between 1965 and 1985. Variations exist around the years of each generation (Howe & Strauss, 2000; Zemke, 2001) since conditions in one area (country, state, locality) may vary and hence create different opportunities for participants. However, the most recent generation, i.e. the generation that follows Generation X, has experienced very different social conditions from previous generations, brought about through the development and uptake of digital technologies. This is most obviously seen in the use of computers but extends to other areas as well, including white goods (microwaves, ovens) and household goods (television, digital versatile discs [DVDs]), as well as personal items (watches, mobile phones, electronic personal digital assistants [PDAs]). Young people born after 1980 have nearly all grown up in environments where they are exposed to such tools. Their exposure to such tools creates different experiences and orientations to learning and thinking.

To differentiate between these cohorts, two different framings can be used: that of generations where intergenerational differences can be seen as a key influence on shaping people, and that of generations where the more defining influence is digital technologies and where there is consequently a substantial gap between those who have grown up with or without such technologies. These differences have been theorized as being akin to learning languages, whereby the native language is learned with relative ease and quite naturalistic. Subsequent languages require considerable effort to learn and there is a disposition to use and think in the native language. Prensky (2005) has coined the term 'digital natives' to refer to the generation who has grown up with digital technologies so that they are a part of their world view. Conversely, those generations who have not grown up in these technology-rich worlds are 'digital immigrants' – they can learn the new technologies but considerably more effort is required than for the digital natives.

There is some benefit in drawing on the constructs of French sociologist Pierre Bourdieu (1983, 1991) to theorize this phenomenon. Using the construct of habitus, which is defined as being the embodiment of culture that provides a lens for seeing and acting in the world, growing up in a digital-rich world offers different potential for constructing a technological habitus than for those who have not grown up immersed in technologies. While Bourdieu's work theorizes the construction of a class habitus, the process through which a habitus is realized can be reappropriated for the construction of other forms of habitus. In the case of this article, I advocate the construction of a digital habitus among younger people in that it allows the theorization of particular dispositions towards the use of digital technologies, in this case the computer. A digital habitus then provides particular ways of seeing and acting in the world depending on whether such a habitus is robust (as in the case of digital natives) or needs to be reconstituted (as in the case of digital immigrants). For digital natives, ways of acting and being in the social world are framed by their experiences with technology. Their worlds are heavily influenced by such technologies. Young children's toys, for example, contain sophisticated technologies in comparison with their parents' toys. One only has to consider the toys produced by manufacturers such as Mattel and the changes over the past 20 years to see how digital technologies are changing the experiences of young children. In turn, such experiences change their dispositions to learning and behaving. Through exposure to, and use of, computer technologies, people come to construct dispositions towards computers.

In terms of the early childhood setting, using a Bourdieuan framing to understand the changing demographics of such settings enables the practitioner to see the child not only as a product of social circumstances (i.e. out-of-centre experiences), but also as shaping the pedagogy and curriculum. The habitus, which Bourdieu describes as the internalization of culture – in this case digital cultures – is both shaped by particular social conditions and shapes those conditions. If the emergence of young children into the early childhood settings is to be seen differently as a consequence of their highly digitized out-of-centre contexts, then the implications for practice are profound.

Older Digital Natives

In this section, I consider the impact of technologies on the older sector of digital natives since they are the forerunners of this generation. Seeing the impact that technology has had on shaping their habitus and the implications this has for their ways of interacting in social contexts, including work, provides evidence of how digital technologies shape the dispositions of this generation. In a later section of the article, I will consider how these digital technologies intersect with early childhood and the implications for this sector.

In a recent study of young people in the workplace (Zevenbergen, 2004), it was found that young Millennial workers have developed very different numeracy dispositions and skills than older generations. They are more comfortable deferring cognitive labour to technology – that is, they will allow tools (such as calculators, computers, etc.) to do the menial work of calculation while they undertake the ‘work’ that is being demanded of them, such as serving customers, building boats, drawing plans, etc. They were very good at using estimation to ‘guess’ the reasonableness of the answer but argued that technology could work out the exact answer quicker and more accurately. Such dispositions may be the antithesis of what older generations see as good practice but when young workers are able to work more confidently and competently, questions need to be posed as to who is right. If one considers the contemporary workplace, then technology is an integral part of that site. In the context of retail, for example, the salesperson must enter sales into the cash register so that a tally of stock is kept. This information is not only used to predict sales in the coming weeks, but also to keep tallies of sales for monitoring finances. Young people are aware of these multiple functions of the tools and hence work within these environments in ways that match the context.

The extensive literature on this generation suggests that there are a number of characteristics that set these young people apart from older generations. They are seen to be more collaborative and desire to work in teams; they have a conservative orientation to life; they are street-smart and techno-savvy; they have an orientation to work where they ‘work to live’; and they are very consumer-orientated. How digital natives come to construct these dispositions and skills is, in part, due to their immersion in digital worlds and their exposure to advertising unlike any other generation. Those digital natives who have reached adulthood have been exposed to new forms of shopping (for example, online shopping via Amazon and eBay), interactions (online games that are linked globally) and multi-purpose tools (the telephone that is also a diary, camera, Global Positioning System navigational tool, calculator, etc.). These are technologies that were not available to other generations and, hence, have created different opportunities for those for whom they are a natural part of their social worlds.

Prensky (2005) argues that digital natives think differently from other generations due to the types of technology to which they have been exposed and the ways in which they have been exposed to these technologies. One only has to consider how the digital native is able to multitask with various tools (for example, a mobile phone, television, DVD, Nintendo and friends). He summarizes these differences by identifying a number of distinct differences between digital natives and digital immigrants.

From Table I it can be seen that the potential habitus of the digital native (early childhood student) is quite different from that of the digital immigrant (teacher). The dispositions towards learning, working, talking, and so on are summarized here by Prensky (2005), where he describes the differences between these two cohorts. The differences in Table I indicate the ways in which technologies have shaped the thinking of digital natives and how this is different from that of digital immigrants.

To gain a sense of how technologies have permeated the lives of digital natives, Prensky (2001) argues that by the time they have graduated from college, digital natives have spent less than 5000 hours of their lives reading but more than 10,000 hours playing videos games and more than 20,000 hours watching television. When this is coupled with other digital media – such as mobile phones, computer games, the Internet, instant messaging and chatlines – there is a plethora of experiences available to this generation that was not present for other generations, both in form and quantity. While many digital immigrants bemoan the time spent on computers by this generation, it may be prudent to be more critical of the assumptions underpinning such criticism. For example, the amount of time and engagement spent with computers can be juxtaposed with

the amount of time and engagement spent with a book. Is this seen as problematic? If not, why not? And why is a book seen to be a more valuable use of time than a computer? When such questions are critically reflected upon, assumptions may be revealed about the hidden values of particular media by different generations. It may be that by the time digital natives are in their twilight years, these criticisms may have been overturned and may never be considered since the computer (or even more advanced technologies) will have replaced print media. Already, books can be bought electronically (e-books), and there are now websites which enable readers access to books which they can read (and download), so that the purchase and modality of books as is currently practised is already being radically revised.

Digital natives	Digital immigrants
<i>Twitch speed</i> Nintendo: quick thinking/reaction.	<i>Conventional speed</i>
<i>Parallel processing</i> Multitasking: phone, Xbox, television, mainstream media.	<i>Linear processing</i>
<i>Random access</i> Hyperlinks, compact discs, multiliteracies.	<i>Linear thinking</i>
<i>Graphics first</i> Seek graphics – pictures, visual representations – for information.	<i>Text first</i>
<i>Connected</i> Listservs, chatlines, email, wikis, blogs, customer-support services offshore.	<i>Stand alone</i>
<i>Active</i> Seek to be actively engaged in activities, e.g. games.	<i>Passive</i>
<i>Pay-off</i> Through games technologies, rewards and pay-offs are central.	<i>Patience</i>
<i>Fantasy</i> Dungeons and Dragons generation.	<i>Reality</i>
<i>Technology as a friend</i>	<i>Technology as a foe</i>

Table I. Differences between digital natives and digital immigrants (modified from Prensky, 2005).

Preschool Digital Natives

So far, I have used examples to demonstrate the impact of technology on older digital natives. However, of concern to this article is the impact of these environments on young people before they enter formal schooling, and the implications for early childhood settings. In this next section, I will discuss the construction of the preschool digital native. Subsequently, I will discuss the implications for the range of facilities in the preschool years.

Shaping the Habitus of the Preschool Digital Native

This generation has been the most targeted generation by the media – it is bombarded with information from a very early age through various media forums. Within the context of early childhood, one only has to consider the phenomenon of the music industry – this is the first generation exposed to pop concerts with bands such as The Wiggles and High 5 in Australia, who specifically target young audiences and have acclaimed status (and wealth) within the music industry. At no other point in history have musicians been able to make considerable wealth from preschool audiences. Similar issues arise if one considers other areas of consumerism. This is a generation for whom clothing labels are a part of their wardrobe. Birthday parties provide another area of considerable spending, particularly by those who have access to money. No other generation has been targeted in terms of consumerism like this generation, even from a very early age. From an early age, they are saturated by the media seeking to tap into their buying power.

Similarly, the amounts and types of toys that are available to this generation are substantially different from other generations. The hi-tech toys produced by manufacturers such as Mattel and Fisher Price are substantially different from those of the past. Toys are highly technologized for young citizens. Similarly, computer software packages geared for young learners are evident in

most software and computer outlets. Thus, from an early age, they are exposed to the richness offered by technology.

Modern homes are abuzz with technological gadgetry. One only has to consider how the television has become technologized. Remote controls, digital boxes, pay television, and so on are a part of the everyday experiences of many preschool children. Scrolling through the remote to select stations, to turn appliances on or off, or to turn on other applications such as DVDs or videos; scrolling through options on DVDs; fast-track programs – these are all part of the repertoire of many preschoolers' home experiences. Access to computers in the home is another area in which young digital natives are shaped by technologies. The Australian Bureau of Statistics (2000) revealed that in 1998, 48% of Australian homes where the oldest child was aged four or under had computers. This number will be considerably higher now with the consequence that many children in early childhood programs are very familiar with computers, either through playing with them and/or seeing significant others working with them.

In a study of home use of computers, Downes (2002) reported that the games format was of particular importance in considering the experiences of children in their out-of-school contexts. She argued that when using computers in the home, there was a strong preference for exploratory learning. This research suggests implications for pedagogy if there are to be resonances between home and early childhood experiences. Similar challenges have been raised by other researchers (Linderoth et al, 2002; Yelland, 2002) where they report favourably on the potential of games formats for learning and engagement. Indeed, Kerawalla & Crook (2002) reported that the games formats they found children using in the home context were quite different from those found in more formal learning contexts.

For the digital natives entering the range of early childhood services, their exposure to technologies is often vast and has shaped them in different ways from other generations, including that of the teaching staff. It then becomes critical to consider the impact of this emergent child in current early childhood settings, and particularly the types and amount of access to computers children have in their early childhood settings.

Technology in Early Childhood Settings

Despite the widespread recognition of the impact of digital technology in the social world, the uptake in education has been limited, particularly in those settings prior to formal schooling. Downes et al (2001) have argued that the lack of computers in early childhood settings is due, in part, to a resistance within the field and wider community, who see the tools as 'neither appropriate or important' (p. 139) in early childhood settings. They also argued that there is a lack of funds within this sector of education to support the purchase of computers and the professional development of teachers. However, the lack of uptake is evident in the schooling sector, where computer technology within the earlier years of schooling is seen as less important than in the upper years of schooling.

Bayhan et al (2002) and Ertmer (2005) support Downes et al's (2001) claims that despite significant technology being accessible to teachers, there has been little uptake of these tools in education. Ertmer suggests that this is, in part, due to teachers' lack of pedagogical knowledge on how to use the tools effectively within the context of the learning environment. Bayhan et al (2002) reported that their participants felt that computers restricted the social development of children. Judge et al (2002) reported a similar position, arguing that there has been a rapid growth in the area of technology and teachers need to be supported in its uptake so as to ensure quality learning experiences for young students. As such, these authors advocate that there is a considerable amount of work to be done in the professional development of educators to support them in using technologies effectively in the classroom. Having access to technologies does not necessarily transfer into quality programs. As Ertmer (2005) claims, teachers need to know how to use the tools effectively. In his study of technology use, Clements (1994) argued that: 'What we as early childhood educators are presently doing most often with computers is what research and NAEYC [National Association for the Education of Young Children] guidelines say we should be doing least often' (p. 33). Clements claimed that technologies were being used in ways that were antithetical to

quality practice and tended to reinforce models of pedagogy which were, in other contexts, abhorrent to the profession.

Quality Use of Computers to Support Learning

When computers have been used to support learning there have been many outcomes noted. In studying interactions – a key aspect of the early childhood learning experience – computers have been found to improve social interaction. For example, Clements (1998) claimed that there was a large increase in interactions when children were working in pairs at a computer compared to when playing with puzzles on the floor. He noted the amount and quality of the interactions, and found them to be substantially enhanced when students worked at computers in pairs.

In terms of working with computers, there have been numerous studies undertaken with various tools provided by the computers. Judge (2002) argued that developmentally appropriate computer use enhances not only what young children learn, but also how they learn. When well-designed software is used with young children, they become engaged, are involved in exploration, their interest is maintained over sustained periods of time and active involvement is encouraged, rather than passive behaviour (Judge, 2001).

Studies have found that open-ended child-directed software makes a more significant difference in children's developmental gains than drill-and-practice software (Haugland, 1992, 1999). Software packages (such as Logo) have particular foci for learning (in particular, logic and shape), whereas other programs that come with a computer (for example, drawing tools) or more generic programs available for early childhood settings can be used successfully to enhance learning. Yelland's extensive work with Logo in the early years has been powerful in highlighting the impact of such open-ended programs on developing mathematical ideas (see, for example, Yelland & Masters, 1997). There are critics of these approaches. Cuffaro (1984), for example, questioned the validity of young children using technology to create 'the perfect square' when they could not draw it for themselves. However, technology can open up greater opportunities for drawing accurately when this is not possible for young children. It is more empowering as children are able to recognize faults in their drawing, despite lacking the fine motor skills to perform the task. Technology allows them to design more complex shapes than would be possible with pencil and paper. Thus, comments such as Cuffaro's become redundant as the fundamental premise of the learning becomes the focus of the activity.

Computer-assisted instruction has been found to aid learning, particularly in mathematics. Rote or drill-and-practice programs have been found to enhance gains in test scores even when as little as 10 minutes per day is given to such programs. Hence, Niemiec & Walberg (1987) have argued that such programs may be more cost-effective than other intervention programs, such as peer tutoring, mentoring or smaller class sizes.

Clements (2002) cites research where computer technology has enhanced many mathematical skills. He argued that sorting activities could be learned just as easily through the use of computers as with concrete dolls (Brinkley & Watson, 1987-88), counting gains were reported for kindergarteners (Hungate, 1982), and that number recognition was improved more through technology than being taught by a teacher (McCollister et al, 1986). He did suggest, though, that there needs to be recognition that when beginning to learn concepts (such as number recognition), this may be more effective when taught by a teacher, and that perhaps children might perform best with computers once they have learned concepts.

Whilst there is considerable support for computers to enable new forms of learning and knowledge, they must be used within quality pedagogical frameworks. Aside from issues of access, there are considerable concerns about how they are used within the classroom. In their longitudinal study of computer access and use, Judge et al (2004) – citing Wenglinsky (1998), Becker (2000) and *Dividing Lines* (2001) – argued that within the American context there was a polarized use of technology, 'where schools serving Black, Hispanic, and low socioeconomic status [SES] students [tended] to have the lowest access to, and the most remedial usages of, new technology' (p. 384). In comparing the use of computers it was found that low SES schools reported more use of computers but the ways in which they were used differed. It was reported that 'lower-income students use computers more often for repetitive practice, whereas higher-income students use

computers more often for more sophisticated, intellectually complex applications' (p. 384). As such, issues of equity and access are important considerations when using computers in the early childhood setting. There is considerable potential for early childhood experiences to bridge some of the possible divides between those young students who do not have access to computers in the home and those who do – but with the proviso that quality learning environments must be an integral component of the planning and implementation of computer use.

Technology and Reconceptualizing 'Play'

When studying the early childhood context, Kontos (1999) argued that there are a number of critical contextual features: the activities in which children are engaged; the ways they interact with teachers; and the social configurations of such interactions and activities. While much of the research in early childhood settings uses these modalities for understanding practices within such contexts, new ways of thinking about these settings may be necessary when considering the impact of digital technologies. The concept of 'play' as it is valued in the early childhood context may need substantial reconceptualisation when 'play' is considered within the digital medium.

There are common themes within the modernist and dominant modes of the literature on play. Youngquist & Pataray-Ching (2004) have argued that within the field, the term is problematic and needs to be better theorized, but they take a modernist position on play without considering the impact of digital technologies. Taking play as an act of inquiry, they have argued that such a position sees the act of inquiry as a rich theoretical position where:

Inquiry requires us to think critically as well as to broaden one's thinking to understand perspectives and experiences different than our own, to advance our world's thinking, to contribute new ideas and to bring love and beauty to our world. (Youngquist & Pataray-Ching, 2004, p. 172)

Other researchers have noted concerns about the role of the teacher, such as the early childhood error (when to scaffold or when to stand back and not intervene [Bredenkamp & Rosegrant, 1995]) or the elementary error (when to intervene in curriculum content). Depending on the theoretical position to which the educator subscribes – such as Vygotsky, Reggio Emilia or developmentally appropriate – the pedagogy will be influenced strongly by the teacher's beliefs about how children best learn. Teacher–student talk is a key feature in understanding the purpose of play within these settings. How the teacher talks with/to students, when such talk occurs, and with what purpose and outcome are influential considerations in the early childhood setting. Whether play is solitary, parallel or interactive are also considerations in the field.

Of interest in this article, however, is the nature of play and what this might mean in a digital age. Creasey et al (1998) claimed, for example, that play with concrete objects fostered creativity and problem solving, while others, such as Lloyd & Howe (2003), have raised questions regarding the value of solitary play with concrete materials. They contended that there is a considerable need to understand this intersection since there may be considerable value in solitary play with concrete materials; yet because of the low value of solitary play this intersection has not been understood. However, as noted in an earlier section of this article, a digital environment offers new and different potentials for learning. But how do such environments sit within the field – a field where the uptake of digital media has been restricted? The question of what constitutes concrete objects comes into question with digital media. Does concrete mean that an object can be manipulated? If so, does the manipulation need to be manual, or can it be digital?

Play and Digital Media

The notion of play and the difference between digital natives and digital immigrants became problematized for me when I heard a friend's story about her six-year-old son who came home and said he wanted to play cricket with his friend next door. This happened over several afternoons and the mother was pleased to know that her son was outside batting and bowling. The mother eventually caught up with the neighbours and they were talking about the boys playing cricket. The conversation went on for some time before the mother realized that their boys were *playing*

cricket on the Xbox and that there was no batting or running involved. For the mothers, this was not cricket, but for the boys it was. The boys felt that they had greater control over the game, were able to assume the identities of their favourite teams or players, and were able to get good scores for batting. For them, they identified quite strongly with the game.

Within this context, for the young boys the concept of play was very different from that of their parents. This difference may be a manifestation of the difference between digital natives and digital immigrants. In this example, it can be hypothesized that the young boys have grown up immersed in their digital worlds so they construct a particular habitus, just as their parents have constructed a particular habitus. For the boys, their digital worlds have enabled their habitus to be one where the notion of play is embedded in a digital world whereas, for their parents, the construct of play is very different. Different assumptions about what constitutes play come to the foreground in these two worlds. Play, for the mother, meant being outside, hitting a ball, running between stumps (either imaginary or real), and being physically active. For the boys, play meant engaging in a computer game, interacting, having success in hitting the ball, and learning cheats so as to move through levels. These are very different representations of play. The digital habitus of the young boys had allowed them to construct a very different view of 'play' from that of their non-digital parents.

These new worlds of play are not restricted to the digital media since there are often vast arrays of supporting paraphernalia. Many games, such as *The Sims*, *The Simpsons*, *Barbie*, *Pokémon*, etc., are supported, for example, by television shows, magazines, websites, trading cards and feature-length movies. The young person has many avenues to explore as a result of these virtual games. Conversations in the playground can centre around the games and other supporting materials. There is an extension of the games into various play areas with children taking on the characters from their games. For many children, the games offer considerably more than entertainment.

Opening Up Possibilities with Digital Media

The power of the computer as a learning device was brought home to me when I observed a young boy in his family home. Keen to show me his 'new computer', the young boy, who was about to start preschool, took me through what he could do on the computer. Mathew was just under four years old. He came from a moderately poor family. His parents had recently purchased a used computer as his older (eight-year-old) sister was using one at school. Both parents had little idea of how to use the computer. After three weeks, Mathew was able to turn the computer off and on; insert compact discs; upload programs from these compact discs; play games; navigate around the programs; change the screen saver; problem solve so that when he made a mistake (for example, clicking on the wrong icons) he was able to work out how to remedy the situation; and he had developed a strong computer language. He was able to articulate how to navigate around the computer; use appropriate computer terminology; 'read' the screen (through letter recognition or using the icons); use pull-down menus; and was confident with the tools. He was able to save and print documents; change font size and colour through the menu options; change fonts; and insert pictures from files and clip art. He had learned this through interacting with his older sibling or through watching her work on the computer. This amount of learning was considerable given that he had had access to the computer for only three weeks and without adult supervision. When these skills were juxtaposed with his other skills, the computer enabled him to do more than was possible without it. Barely able to write his name with pencil and paper, Mathew was able to type his name, and his sister's; print them in a range of fonts (using the format menu); and change the colour and size using the tools menu. He knew how to make the name into a banner but would not do this as it 'would use too much paper'.

The range of possibilities had opened up considerably for Mathew. In this case, the range of learning was diverse and achieved in a short space of time suggesting that computers offer not only new skills but also new ways to learn. In this case, the teacher–student dyad was between siblings and through observations. He was learning to read but in a multimodal sense – letter recognition as well as iconography. The icons commonly used in computer-based interfaces pose a new literacy, one which Mathew was showing strong signs of engaging with and learning quickly. His inability

to use traditional writing instruments – i.e. pencil and paper – to write his name was superseded by his letter recognition skills and he was able to produce evidence that he was able to write his name (and his sister's). In a traditional format, this skill may have gone unrecognized. His computer language skills were being developed, as were his fine motor skills. While different from the skills traditionally used in the early years, he was able to operate a mouse very accurately and quickly. Moving the mouse around the screen to click on items, pull down menus, draw lines and objects, move objects to create images, and so on required him to have a reasonable level of fine motor skills, albeit different from those needed for cutting or painting.

Implications for Early Childhood Practice

What I have sought to do in this article is to highlight the emerging differences between digital natives and digital immigrants in order to discuss the implications of such differences for early childhood educators. What is becoming clearer is that young children are growing up in a world vastly different from that of previous generations. These social and technological differences offer considerable scope for children and educators. This phenomenon has been framed using Bourdieuan theorization whereby the differences between young children and their parents/teachers could be seen as being a consequence of children's immersion in digitally mediated environments. Such experiences shape the construction of a particular habitus. This suggests that early childhood settings need to be more embracing of new technologies – in this case computers – if they are to provide quality learning environments for the digital natives who are now entering them. However, as the literature suggests, technology is not being taken up in the early childhood contexts with as much interest as may be required. When differences in access and quality programs are considered, there is a recognition that there is a digital divide between the rich and the poor. Early childhood settings have a role to play in bridging that divide by providing quality experiences for children for whom access may be an issue in the home setting. By providing appropriate learning opportunities within early childhood settings, educators may help to alleviate potential differences in learning outcomes.

Research into the uptake of computer technology in early childhood settings suggests that there are a number of factors militating against reform in this sector – the cost of computers is one area – but the professional development of educators along with ideological assumptions about quality programs may be instrumental in changing current practice. By offering early childhood educators the opportunity to undertake professional development so that they can see the potential of such technologies, ideological assumptions that underpin much of the pedagogy in early childhood may be challenged and replaced with approaches that value aspects of computer technologies.

There is a considerable body of research that shows that virtual tools (such as software and games) can enhance student understanding and even create new ways of understanding. The virtual world enables students to create objects that it is not possible to create with their existing skills. Furthermore, when introduced in quality learning environments, computers can facilitate interactions which were not evident in traditional practices. As such, much of the potential of computers has not been realized in the early childhood setting. These tools can be enabling when used well and in quality learning environments.

Computers need to have a higher profile in the early childhood setting, particularly when considering issues of equity and access. They have considerable potential to address the divide between those who come to preschool settings with a wealth of experiences with technology and those who come from technology-poor families. It is becoming increasingly important for all students to have access to computer technology. As the case of Mathew highlights, young children can learn quickly when provided with opportunities. The early childhood setting is critical in the development of children, so opportunities to use, explore and become proficient with computers are essential, particularly for those who do not have access to computers in the home environment. The provision of quality learning environments within the preschool has considerable potential to add digital capital to those students for whom the home experience is digitally impoverished in comparison with their more affluent peers. By addressing such differences as early as possible, the gap between the haves and have-nots can be reduced.

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