Nurturing early learners in the digital world: A parental perspective
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Abstract
In today’s contemporary society, parents need to prudently integrate digital devices into their children’s lives to nurture, and not hinder their holistic development. Normatively, a four- to six-year-old child is expected to achieve numerous developmental milestones, as outlined in the Nurturing Early Learners (NEL) framework. The NEL framework classifies these milestones under various learning domains, skills and competencies, namely Aesthetics and Creative Expression, Discovery of the World, Language and Literacy, Motor Skills Development, Numeracy, and Social and Emotional Development. Through qualitative interviews conducted with 21 parents (14 mothers and 7 fathers) online who spoke about their four- to six-year-old children, this study investigated how parents wielded digital devices to foster their children’s development in these key domains, but deliberately ring-fenced their children from pernicious use.

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Introduction
In this contemporary era, digital devices such as smartphones, tablets, and screens have become integral tools for living in society. Mobile devices have exponentially reigned as children’s favoured media appliances because of their portability, array of content, and interactivity (Radesky, et al., 2015). A 2022 study in the U.K. disclosed that 39 percent and 78 percent of three to four year olds utilised a mobile device and a tablet respectively while 50 percent and 83 percent of five to seven year olds interacted with a mobile device and a tablet respectively (Ofcom, 2022). Similarly, 64 percent of children aged three to four years old and 81 percent of children aged five to eight years old in America, engaged with tablets (Auxier, et al., 2020). Furthermore, Auxier, et al. (2020) found that 60 percent of children began using a smartphone even
before the age of five. In Singapore, 61 percent and 80 percent of children less than seven years old used the computer and Internet respectively (Infocomm Media Development Authority, 2019).

Today, digital devices and media have pervaded our society at a supercharged speed. Digital media has surreptitiously shaped the way children understand the world and interact with their environment, fundamentally altering the way they assimilate information and learn. Thus, regardless of the benefits or risks of digital media, teaching young children to engage with digital devices is inevitable in our progressively digitised world. As the early years are the most formative years of a child’s life for learning, it is important that parents — the primary caregivers of their children — prudently incorporate digital devices into their children’s lives to nurture their digital literacy.

Literature review

According to a 2019 study in Singapore, parents permitted their young children to use media devices because they viewed media as a tool to facilitate children’s education and learning — more specifically their language and literacy skills (Chen, et al., 2019). Furthermore, the use of devices potentially developed children’s fine motor skills (Chen, et al., 2019; Madigan, et al., 2019). Interestingly, digital media programmes were more adept at prompting responses from children because of their heightened interactivity, making the typical unidirectional style of teaching where children solely received delivered messages, pale in comparison (Chen, et al., 2019). Learning applications on devices enabled children to learn at their own pace as well (Chen, et al., 2019).

While there are many guidelines mapping children’s healthy development, the next section introduces a framework this study adopts for describing children’s developmental milestones/outcomes.

Child (four to six years old) developmental milestones/outcomes/skills/competencies

In the impressionable years of four to six years old, young children are expected to achieve certain developmental milestones to be adequately prepared for formal education in primary schools. This study adopts the NEL curriculum, developed by Singapore’s Ministry of Education, as a framework to classify various learning domains, skills, and competencies (Singapore Ministry of Education, 2023). This is not an endorsement of the NEL framework, nor are there suggestions that it is internationally recognised and/or adopted, however, it was developed based on credible studies conducted locally and internationally. Guided by these studies organised by the National Association for the Education of Young Children, the NEL framework is grounded by developmentally appropriate, hands-on, and sequential (scaffolded) practices which are intended to hone four to six years old children’s holistic development. While the NEL framework is intended as an instructional tool for preschool educators, this study nonetheless adopts the learning areas, skills, and competencies, highlighted in it — namely Aesthetics and Creative Expression (ACE), Discovery of the World (DOW), Language and Literacy (L&L), Motor Skills Development (MSD), Numeracy (N), and Social and Emotional Development (SED).

Aesthetic and creative expression (ACE)

As children are naturally captivated by the arts and music, they are encouraged to practise self-expression, imagination, and creativity without inhibitions when exploring them (Singapore Ministry of Education, 2023). Preka and Rangoussi (2019) communicated that music education was perceived as instrumental in the nurturing of children’s cognitive capacities. Some learning facets of ACE include children’s (1) display of enjoyment of art and music activities; (2) ability to express their ideas and feelings through these activities; (3) capacity to craft using their experimentation and imagination, as well as; (4) articulation of their thoughts about their works. When crafting art, children are often taught the fundamental elements of art such as lines, colours, shapes, and textures. How children skillfully include them in their artworks,
however, is dependent on their imagination and creativity. Regarding music and movement activities, children are typically taught the basic elements of music such as rhythm, tempo, pitch, and dynamics through the use of body percussions and instruments. Listening to, and singing, a diverse variety of rhymes and songs plays a pivotal role in cultivating children’s ACE as well.

**Discovery of the world (DOW)**

Children, who are innately curious individuals, will robustly explore their immediate environment to uncover how the world works (Singapore Ministry of Education, 2023). Similarly, the National Association for the Education of Young Children (2009) noted that young children construct their understanding of the world through a trajectory of their personal experiences within an environment: their nurturing relationships formed with others, their play of tangible materials, and the types of information they assimilate from media. To foster children’s DOW, field trips and hands-on experiments are purposefully planned for children to explore their environment and observe, reflect on their findings, enquire, and formulate answers about the mechanisms of the world (Singapore Ministry of Education, 2023; National Association for the Education of Young Children, 2009). Through a sense of wonder and a joy of discovering inherent in the learning of DOW, children are gradually nurtured to (1) show an interest in the world they live in; (2) find out why things happen and how things work through simple investigations, as well as; (3) develop a positive attitude towards the world around them. As they become responsible for their own learning — where they self-construct their knowledge in their own ways — they will comprehend information in a more perceptive fashion, enhancing their capacities to translate this understanding to other learning contexts (National Association for the Education of Young Children, 2009).

**Language and literacy (L&L)**

According to the Singapore Ministry of Education (2023), language entails listening and communicating within a system that bears its own guidelines and conventions, while literacy involves reading and writing in order to understand print and impart meaning using print. The learning goals for L&L are as follows: children (1) listen for information and enjoyment; (2) speak to convey meaning and communicate with others; (3) read with understanding and to elicit enjoyment as well as; (4) use conventional symbols of language to articulate ideas and information. According to the National Association for the Education of Young Children (2020), from infancy to when children reach eight years old, proactively building on their vocabulary is essential, as their extensive vocabulary will become a catalyst for their listening and reading comprehension. Thus, exposing children to a variety of books and materials that they genuinely enjoy and are engaged with, will elicit questions from children, which in turn, nurtures their vocabulary, print and book awareness as well as phonological awareness. These skills work in tandem to hone children’s writing capacities, reading and listening comprehension as well as aptness in communicating with others (Singapore Ministry of Education, 2023).

**Motor skills development (MSD)**

MSD encompasses three categories of learning which are: Motor Skills Acquisition, Health and Fitness, as well as Safety Awareness (Singapore Ministry of Education, 2023). Firstly, Motor Skills Acquisition entails the refinement of children’s gross and fine motor skills, which will in turn hone their physical self-efficacy. Next, Health and Fitness endeavours to educate children on favourable health habits. Lastly, Safety Awareness warrants children to learn about the cruciality of safety and how they can avert or circumvent danger at home, in school, or in public places. The learning goals of MSD are as follows: children are able to (1) enjoy participating in a diverse variety of physical activities; (2) demonstrate control, coordination and balance in gross and fine motor tasks, as well as; (3) develop healthy habits and safety awareness at home, in school and at public places (Singapore Ministry of Education, 2023). While NEL theoretically advocates for children’s participation in physical activities to hone their motor skills, the National Association for the Education of Young Children (2020) shares similar sentiments that indoor and outdoor play cultivated children’s physical gross- and fine-motor competence. Pertaining to gross-motor skills, children from four to six years old were envisaged to possess the ability to balance, hop, stand, gallop, catch
moving objects as well as manoeuvre backwards. Regarding their fine motor skills, children were expected to acquire a certain proficiency in hand-eye coordination and dexterity to facilitate their writing, cutting, and picking up of delicate articles using either their fingers or another object (Gerber, et al., 2010).

**Numeracy (NM)**

Refining children’s conceptualisation of numeracy enables them to view its associated concepts and skills in ways that relationships and connections are forged, which they can meaningfully apply in their daily experiences (Singapore Ministry of Education, 2023). Some of these concepts include but are not limited to matching, sorting, ordering, patterning, comparing and rote counting. When children are granted opportunities to manipulate concrete materials, they are more disposed to discern relationships in numeracy, as well as extrapolate how they are linked to one another and with other learning domains. Learning aspects of numeracy entail children’s (1) recognition and application of basic relationships and patterns; (2) usage of numbers in daily experiences, lastly; (3) recognition and operation of basic shapes and simple spatial concepts in daily experiences (Singapore Ministry of Education, 2023). Akin to the teaching of early literacy, educating children about numeracy was significant in bridging the achievement gap and heightening their primary school readiness. Moreover, young children’s ability to count scaffolded their assimilation of more complex numerical concepts (National Association for the Education of Young Children, 2009).

**Social and emotional development (SED)**

SED underpins children’s development of positive self-concept, self-identity, and self-awareness. When children are more attuned to their individuality, they will grow to respect the diversity of their peers, appreciate the uniqueness inherent in them, and begin fostering nurturing relationships with them. With a healthy sense of self-identity, children can learn to better self-regulate their emotions and behaviours to make responsible and rational decisions. The NEL framework does not allude to children’s natural development of social competence as they mature, but rather, activities are intentionally designed and implemented, and incidental teachable moments are scoped out and capitalised on to foster children’s SED. SED’s learning objectives involve children (1) developing an awareness of personal identity; (2) managing their own emotions and behaviours; (3) showing respect for diversity; (4) communicating, interacting and building relationships with others, and lastly; (5) taking responsibility for their actions (Singapore Ministry of Education, 2023). When children are in an environment filled with responsive, nurturing and warm adults who gradually scaffold their socio-emotional skills, children will eventually cultivate favourable traits and temperaments where they practise level-headedness in the decisions they make. As children grow in socio-emotional resilience, they will become more confident in learning and attempting new skills, consequently supporting their learning in other domains (Shonkoff and Phillips, 2000; Denham, 1998; Dunn, 1993).

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**Research question**

Although digital device use may bring about beneficial outcomes across children’s developmental domains, there are significant caveats borne of technology, which many studies have discussed. Cognisant of young children’s susceptibility to the egregious effects of digital device usage, the American Academy of Child & Adolescent Psychiatry (2024) issued a guideline recommending that an approximate one hour and three hours of non-educational screen time per weekday and per weekend day respectively, sufficed for children aged two to five years old. For children aged six years and above, physiologically healthy habits should be developed and screen activities should be regulated. It is notable that these guidelines are not exhaustive and other associations may boast different stipulations.

Despite an increase in young children growing up in media-saturated environments, scant studies have been
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conducted on how parents, the authoritative figures of children, deliberately wield digital media to foster young children’s development. Although some parents employed digital devices as innocuous tools to facilitate their child’s learning, others articulated that excessive digital device usage would harm the child physiologically (Chen, et al., 2019). Thus, this study investigates how parents navigate this conundrum, where they concurrently harness the affordances of digital media devices and reduce their associated risks to intentionally nurture their early learners.

As such, the research question is ‘How do parents use digital media devices to nurture early learners in various learning domains?’

### Methods

As this study was largely inductive and exploratory in nature, qualitative interviews were employed as the research method. Prior to data collection, ethics approval was sought and obtained from Singapore Institute of Technology Institutional Review Board (Ref: 2023006) to conduct a study involving parents in Singapore. Thereafter, through convenient snowball sampling (the authors reached out to their contacts who fit the sampling criteria), parents of children aged four to six years old were recruited to participate in a qualitative interview conducted online. Upon receipt of signed online consent forms, the authors proceeded to contact the respondents to arrange an online interview slot. During the online interview, after the authors explained the purpose of the study, respondents’ verbal consent was sought and they were afforded an opportunity to clarify details about the study. The sample included 21 parents (14 mothers and seven fathers), and the interviews were conducted between January to April 2023. Each interview was conducted by both authors and was recorded. Each interview lasted approximately 30 minutes and was transcribed using AI technology.

The interviews elicited parents’ thoughts and perceptions on digital media use for young children, as well as how they (parents) have wielded digital media devices to nurture their children in the various learning domains. Information on noticeable child outcomes, as a result of digital media use, was also obtained from parents. Examples of questions asked are “What did you notice about the effect the digital device usage had on the child?”, “What changes (if any) were there on self-help skills, i.e., brushing teeth, eating independently, wearing their clothes, tying shoelaces, etc.?” and “What changes (if any) were there in relationships with other students/children?”

Iterative discussions took place regularly (after every interview) between the authors to thematically analyse the emerging data based on the NEL framework. Data collection was halted after reaching data saturation, where the authors felt that no new relevant information emerged for three consecutive interviews. Similar to Lacey, et al. (2022), the authors in this study concurred that data was sufficient for the intentions and purposes of this study. The data was reviewed by both authors and coded in accordance with the themes of the NEL framework, which will be deliberated further in the following sections.

### Findings

#### ACE

ACE pertains to children’s enjoyment of art and music activities, as well as their capacity to express themselves through their crafts, which are unequivocal products of their experimentation and imagination. From the interviews, some parents conveyed that their children revelled in the videos they consumed from YouTube Kids — in which they sang and modelled movements. Some children, after watching digital
media programmes, were even inspired to craft related toys using recycled materials:

46-year-old father who recounted the experience of his then six-year-old boy: I just [provided] him [with] cardboard and tape, and [from] what he [watched], ... he [would] make his own toys.

Furthermore, a mother shared that colouring applications on devices provided her child with opportunities to liberally experiment with colouring and decorating. For example, the online medium allowed her child to easily ‘redo’ pictures to try out different colour schemes and embellishments, encouraging creativity as a result.

Interestingly, a parent permitted his five-year-old daughter who was a dancer, to set up an Instagram profile to learn about dancing and to document her dancing journey; she would express and create moves in the posts, to intentionally attract sponsors and share with her friends (who were dancers and had Instagram accounts). All of the uploaded posts on Instagram, however, would be facilitated by an adult.

Moreover, a parent with a six-year-old son signed him up for an online piano programme that incorporated theoretical modules, lessons, and games. While the son played on an actual piano keyboard, the 15–20 minutes programme was displayed on a tablet screen. His parent expressed that his participation in this piano programme was generally supervised:

37-year-old mother with six-year-old boy: ... [the programme] will play one song throughout the module [which] progressively continues. He [will] follow the beat and tune [of the song] and [goes] along with the module.

DOW

Conventionally, children are inquisitive and are intrinsically motivated to explore their immediate environment to discover how the world works. In this learning domain, children are expected to deduce the mechanisms of the world through supervised, rudimentary investigations, which in turn compels them to view the world through positive lenses.

Numerous parents shared that their children assimilated diverse types of knowledge from the assorted media they consumed. For instance, some children were granted autonomy to consume from an unfettered basket of age-appropriate content like Netflix (age-restricted) and YouTube Kids. In doing so, a four-year-old boy discovered new scientific words like ‘magma’ and ‘volcano eruption’, which precipitated his interest in volcanic science. Digital videos bestowed him with extensive knowledge on palaeontology as well:

33-year-old father with four-year-old boy: ... [the video helps] with his imagination [of] things ... and a bit [on his] understanding of why some things happen in the world ... There was a period of time where he [was] very into palaeontology, [and] he [liked] dinosaurs a lot. He [was] able to name most of the dinosaurs that he [saw] on the show.

Other parents highlighted similar statements — from media consumption, children were able to discover and learn from a broad range of scientific topics which were not typically taught in their preschools. These topics ranged from the human anatomy, volcanoes, wild animals and their reproductive systems, to the manufacturing of paper. Another parent recounted how her child conversed with an iPad’s Siri about anything and everything. The abovementioned findings demonstrated that children had employed digital devices to investigate various concepts and construct their knowledge of them.
Such inherently motivated behaviours in children to uncover how the world works were encouraged by their parents. However, there were occasions where parents were central to the development of their children’s DOW. For instance, a child who was curious about excavators, drillers and transportation, solicited his mother’s help to dig up information about them on the Internet. Many parents believed that online shows left a lasting impression on their children as well.

In another mother’s case, her four-year-old boy would take hold of her phone to take photos and videos around the house:

37-year-old mother with four-year-old boy: Whenever I [was] not looking at him, he [would] grab my phone [to immediately] press it, somehow, he managed to press the [camera] function and it [turned] on. He realised that he [could] actually take my phone and view the world through my camera lens… that kind of fascinated him I supposed. [When] he [knew] how to press the ‘captured’ feature, he [would] grab and take pictures of various items in the house. [He would also] video.

As the child’s mother looked upon her son’s new hobby favourably, she encouraged her son to take more photos beyond the capacities of her iPhone. Thus, she purchased a small digital camera (which was child-friendly) for him. The child’s operation of his new digital camera potentially heralded secondary/multiplier effects of digital device usage. Beyond his sense of curiosity about the world being piqued further, his fine motor skills were refined as well when manipulating the digital camera.

L&L

L&L entails listening, communicating, reading and writing within the perimeters of a system which bears its own rules and conventions.

Many parents highlighted that digital media had cultivated their children’s communication skills. Apart from building on children’s vocabulary, media heightened children’s ability to speak in full sentences as well, enabling them to convey their needs more effectively.

Fascinatingly, a mother recounted that her child who was characteristically shy, gradually grew in confidence in expressing himself after device usage. The child’s hindrance in self-expression was initially presumed as ‘speech delay’, but was later attributed to his introverted nature. His multifaceted usage of the device not only honed his phonics and emulation of intonations but graced him with more topics to converse with his family as well:

45-year-old mother with five-year-old boy: I downloaded some [phonics games] for him to discern sounds and [listen to them]. After a few practices, he [kept on] repeating [the sounds]. Eventually ... he did manage to speak ... He [had] no problems with speech, I was always concerned about it. I was always asking the teacher [about] whether he [had] speech delay, but they [would] say no, just that he was a bit shy. So, I think his inhibitions [disappeared] because of his usage of the devices. In that world, he is more confident because whenever he is playing, he is speaking and talking to his brothers, he has something to relate [to with them] ... his playing of games [serves as] a point of conversation to us [as well].

Moreover, many parents shared that digital devices were wielded to purposefully support children’s
learning of their mother tongue. For instance, watching Chinese cartoons and attending Chinese enrichment classes were facilitated through a device. A parent even disclosed that through the dubbed cartoon programmes on YouTube Kids, his children were gradually learning the basics of a third language, Korean.

**MSD**

MSD encompasses children’s joy of participating in a plethora of physical activities, their adeptness in gross and fine motor tasks as well as their piecemeal development of healthy habits and safety awareness.

Multiple parents highlighted that their children’s inclination to practise self-help skills was induced by digital media programmes. For instance, some children would brush their teeth while singing along to tunes, while others would independently feed themselves as they modelled what another child did on a show. Moreover, a parent had employed devices as extrinsic motivations for her children to accomplish self-help tasks (brushing teeth, cleaning up of toys), inadvertently nurturing their fine motor skills as a result. Beyond self-help skills, a mother conveyed that through an online piano programme, her son dexterously worked his fingers to play the keyboard. Thus, these behaviours and programmes which were perpetuated by digital media and device use, fostered children’s fine motor skills and hand-eye coordination.

Remarkably, numerous parents recounted plausible secondary/multiplier effects of media use in this domain. In regard to the nurturing of children’s healthy habits, a parent described how his child was inspired by a YouTube channel to learn gymnastics:

42-year-old father with six-year-old girl: ... [on] YouTube, she follows [these] groups called ‘Fun Squad’ or ‘Ninja Kids’ ... they are [about] gymnastics ... she [would] watch and learn from them. That [was] why she [loved] gymnastics, and I [enrolled] her. That [was] how she picked up gymnastics ... she [learnt it] at home, and [found] it interesting. She [wanted] to do and learn more, [thus] I enrolled her [for] outside [classes].

As the parent desired for his daughter to lead a healthy lifestyle, he viewed his child’s enthusiasm to pick up gymnastics favourably, as it was a form of exercise. Beyond instilling healthy habits, the parent disclosed how his six-year-old daughter would share and converse what she learnt from gymnastics with her younger sibling as well. Under parental supervision, they would perform gymnastic moves together. In doing so, not only were her motor skills fostered, but her socio-emotional and language skills were conceivably honed as well.

Apart from encouraging a healthy lifestyle, the same parent capitalised on the media his children watched to advise them about safety awareness and ways danger can be averted:

42-year-old father with six-year-old girl: ... sometimes we will hear what they watch ... [and] we will take some examples, like ... [do not] talk to strangers, the key must [be kept] properly, [do not] take strangers’ things. Sometimes, we [see these] and on the spot, we will tell them.

Similarly, another parent conveyed that after her child was exposed to ‘toy unboxing’ videos on YouTube Kids, her child developed an interest in slime and asked his parents to purchase slime for him. Thereafter, he and his sibling would manipulate the gossamer slime together during playtime. Aside from the conspicuous refining of his fine motor skills, his socio-emotional and language skills were ostensibly nurtured as well when he interacted with his sibling. The same parent conveyed that she was considering enrolling her child for self-defence classes as her child requested to learn self-defence skills after watching cartoons, potentially heralding secondary effects on her child’s learning.
Nevertheless, some parents remained rooted in their view that motor skills were best fostered in physical activities outdoors. Another mother shared how digital device usage perniciously affected her daughter’s sleep habits. She attributed her daughter’s inability to fall asleep, to her consumption of overstimulating digital media content before bedtime. This finding was underpinned by another study, which uncovered that children’s subjection to light during media use subdued melatonin secretion, which could plausibly retard the onset of their sleep if devices were used preceding their bedtimes (Zimmerman, 2008).

**NM**

Numeracy enables children to view its associated concepts and skills in ways that relationships and connections are forged. The cultivation of children’s numeracy warrants them to recognise simple patterns, shapes and relationships as well as incorporate numbers in their daily experiences.

Many parents had sparse knowledge of how devices could be engaged to nurture children’s numeracy. However, several parents did convey that a Netflix show (‘Numberblocks’) which incorporated counting in their songs, piqued their children’s interest in numbers and counting; consequently, improving their rote counting. Additionally, through a ‘number’ game where players were required to pop numbered balloons according to the digits displayed on the screen, a parent recounted that the game reinforced his child’s recognition of numbers. However, the parent shared that this digital game was not exceptionally effective in nurturing his child’s numeracy, as his child, on occasion, would fail to follow the rules of the game.

**SED**

SED refers to children’s development of positive self-concept, self-identity, and self-awareness. With a healthy sense of self-identity, children learn to make responsible and rational decisions with equanimity, as well as forge nurturing relationships with others.

Parents disclosed that digital media graced their children with conversation starters with their peers. The topics they would chat about ranged from new dancing moves, gymnastic content to common interests in games and shows. Undoubtedly, some of these exchanges were secondary effects of digital device usage.

Furthermore, a parent shared that after her twins watched a show, they were more apt to show love where they would often hug each other — these affectionate gestures were spurred on by the parent. Additionally, a mother described how her child was influenced by a show to emulate positive social behaviours in the house — namely to ‘take care’ of her brother. However, her attempts to ‘take care’ of her brother were done assertively at times:

38-year-old mother with five-year-old girl: Let’s say this [character] is like a big sister [in the show where she] has a few other younger siblings ... that is where [my child would] emulate the behaviour ... but it could be done forcefully as well, there is good and bad ... sometimes the brother may want to follow her way but sometimes if the brother doesn’t, she may do it forcefully.

Another parent conveyed that because she was cognisant of the new digital era and the social dynamics her child was growing up in, she granted him autonomy in deciding which age-appropriate video games to play, to prevent the child from feeling left out among his peers. Parents were well-acquainted with the fact that contemporary media had covertly shaped the environment children grow up in, influencing the conversations they hold and the relationships they form. They have thus permitted their children to continue interacting with devices.

Furthermore, the same parent wielded devices to teach her child delayed gratification:
Beyond using devices to educate children on emotional self-regulation, a parent conveyed that her child independently utilised a device to take selfies and mirror selfies of her outfits — which enhanced her awareness of her self-identity. Nonetheless, there were occasions where children’s socio-emotional skills and competencies were indirectly fostered. Numerous parents recounted that arguments would ensue when siblings failed to arrive on a common show to watch together, warranting parents to intervene and mediate the dispute, consequently encouraging them to practice self-regulation and turn-taking.

### Discussion

This study found that parents were generally cognisant of the dangers inherent in digital device usage. However, they acknowledged that eschewing devices from their children could perniciously affect their children’s comprehensive development, considering the media-saturated environment and social dynamics they grow up in. Thus, parents proactively harnessed digital devices to intentionally nurture their children’s learning domains, skills and competencies, albeit in a highly supervised fashion. Multiple parents employed devices to deliberately extend children’s learning at home, where the media consumed would complement the content children were being taught in their preschools. For instance, songs that were introduced in their preschools were replayed at home for children to sing along to.

While it is indisputable that parents are pivotal figures in supporting and extending their children’s learning at home, this study found that parents actively adopted digital devices as teaching aids. According to Vygotsky’s sociocultural theory of cognitive development, learning is a social phenomenon where individuals (children in our case) develop knowledge and capacity through engagement with those who possess greater knowledge or skill (Cherry, 2022). It has been established that parents, educators, peers, caregivers as well as society played influential roles in the cognitive development of an individual (Medical College of Wisconsin, 2022), where adults (also known as the more knowledgeable other) scaffold children to propel them through their zone of proximal development (ZPD) to attain knowledge. ZPD is a zone that focuses on what the child can do with little guidance (Levine and Munsch, 2018).

However, this study seeks to point out that the theory was established decades ago when digital devices were not yet developed and prevalent in society, thus, it is not emblematic of the current digitised world. Back then, the idea of teaching was synonymous with only humans. Today, learning can stem from consuming digital media content — which this study showcased in many examples where parents engaged the help of digital devices to propel their children through their ZPD. Parents left their children to their own devices when they discovered that their children were learning more from digital media content (e.g., YouTube Kids) than the parents themselves. For instance, a parent permitted his child to continue watching science-related videos as he was cognisant that the digital media content bore more comprehensive knowledge of “magma” than himself. In some cases, the intentional passing of devices to children (as parents were preoccupied with other tasks) led to unintentional learning from media content on the children’s end. Thus, insofar as this study found, parents largely relied on devices to nurture their children’s learning, adding meaningful insights to the theory that humans are not solely influential in children’s learning, but devices as well in this contemporary digital world.

More importantly, this study uncovered numerous secondary/multiplier effects of digital device usage. In this study, numerous parents observed that their children had actualised an interest in a particular hobby or sport from the media they consumed. Like clockwork, parents took the necessary actions to bring their children’s aspirations to fruition. For instance, some parents enrolled their children in enrichment classes,
while others purchased objects for their children to explore their areas of recreation. In doing so, parents consciously embraced resources to nurture their children’s learning domains, procuring proficiency in the related skills. Interestingly, the direct fostering of one domain frequently impacted other domains (in some instances more than one other domain, but a few other domains were impacted) positively as well — thus the term secondary/multiplier effects.

Incidentally, an array of learning domains, skills and competencies were indirectly fostered when devices were flaunted as extrinsic motivations. For example, a mother was found teaching her children delayed gratification. This finding was congruent with another study which revealed that parents rewarded or sanctioned children’s behaviour by respectively endowing their children with or depriving them of digital devices (Wartella, et al., 2014). However, when children engage in activities for extrinsic rewards, their accomplishment of the tasks belies their innate motivation to reach the end goal, as children primarily wish to complete the tasks to attain the reward (Legault, 2016). Thus, parents ought to be more vigilant in incentivising activities with digital devices, as children may manifest an overreliance on them (digital devices) to undertake the tasks (which nurture other learning domains) that they find undesirable, arguably overlooking the fostering of age-appropriate child developmental outcomes.

As an extension to the caution on how nurturing certain developmental areas can be detrimental to other areas, this study found that some parents had unthinkingly deployed devices to distract children from their unfavourable emotions. For instance, we found that when a child made a fuss about how their older brother was allowed to watch a show that they were not permitted to watch, devices were employed to ‘regulate’ the child’s emotions. This phenomenon has been coined ‘media emotion regulation’ (Coyne, et al., 2023; Coyne, et al., 2021). Researchers have saliently cautioned that heightened levels of media emotion regulation were correlated with poorer emotional knowledge and empathy as well as higher emotional reactivity in young children (Coyne, et al., 2023; Coyne, et al., 2021). Furthermore, when devices are used to assuage children’s negative emotions, opportunities for them to learn positive self-regulation strategies are derailed, thereby posing a detriment to other competencies such as SED. In more dire situations, children may become habituated to hinging on media to cope with their fervid emotions (Gordon-Hacker and Gueron-Sela, 2020). Thus, employing devices to distract distressed children can egregiously affect their SED, as it is plausible that children need to ride out their emotions to understand what they are feeling.

Additionally, this study discovered that relentless digital device usage precipitated poor eyesight in children. To reverse the adverse physiological impacts on their eyesight, parents sought the assistance of eye specialists. Thereafter, from the doctors’ recommendations, children’s screentime was regulated, breaks between screentime were incorporated, and their postures were examined. Eventually, eyesight gradually improved. The National Association for the Education of Young Children (2009) envisaged that changes in one area often facilitated or restricted development in other learning areas. In this case, the incorporation of devices to foster children’s other developmental areas, curtailed the nurturing of their MSD, as healthy habits such as the moderation of one’s screen time were not cultivated in time.

As such, although digital media and devices have democratised children’s access to educational content and new skills, this study proposes that digital entities should not substitute children’s opportunities for real, hands-on experiences (Donohue and Schomburg, 2017). Parents can strive to find a balance between incorporating digital device usage and designing real-life explorations for their children’s learning. DOW specifically, can be cultivated through a curated blend of outdoor exploration time and digital media consumption. For instance, children can become intrigued about certain objects they observe in their environment during outdoor play. Upon noticing this, adults can intentionally employ digital media to underpin their curiosity, and extend their knowledge of the aforementioned objects. Through deliberate scaffolding from more well-informed adults, children can successfully use their five senses and simple tools or technology to explore, discover, and make sense of the world they live in. Nevertheless, it is notable that children are inherently unique and differ from one another in their personalities, temperaments, hobbies, and interests; thus, the aforementioned suggestions are not a one-size-fit-all approach, but a guide for how digital devices can be successfully integrated into the facilitation of children’s learning.
Conclusion

In summary, numerous parents in this study possessed the capacity to tailor their domestic digital media environment in accordance with their children’s individual learning needs. Moreover, parents were cognisant that nurturing children’s digital literacy was paramount, given digital devices’ ubiquity contemporarily. If children abstained from digital devices, a chasm between their environment and reality would materialise, resulting in a cumulative disadvantage in their holistic development.

This study is limited in its ability to make generalisable claims, as it was done through convenient snowball sampling. Moreover, due to the nature of the study observing the use of digital device, it would imply that the respondents interviewed would be of a higher social economic status (financially able to afford digital devices). However, this study garnered sufficient qualitative data to observe secondary and/or multiplier effects of such deliberate use of digital devices, by parents, to foster their children’s learning areas. This study also cautioned the detrimental impact of digital device use on other growth domains, when the use appeared to have positive implications on a particular developmental outcome.

Nonetheless, parents, who are the primary caregivers of children, have to be devoutly present in their children’s digital journeys, as children learn best when they are being scaffolded by more knowledgeable adults. Parents should be cautious not to wield devices as educational substitutes but harness them as educational assistants instead.

About the authors

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**Editorial history**