The impact of screen time on children's well-being development: a scoping review

Rita Wong Mee Mee[1], Noor Hanim Harun[2], Lim Seong Pek[3], Suzulaikha Mohamed[3], Tengku Shahrom Tengku Shahdan[4], Anisa Ahmad[5]

[1]Centre for Language, National Defence University of Malaysia, Kuala Lumpur, Malaysia
[2]Department of Early Childhood, Faculty of Education and Social Sciences, Universiti Selangor, Selangor, Malaysia
[3]Department of Language Education, Faculty of Education and Social Sciences, Universiti Selangor, Selangor, Malaysia
[4]School of Education and Human Sciences, Albukhary International University, Kedah, Malaysia
[5]Association of Registered Childcare Providers Malaysia (PPBM), Selangor, Malaysia

Article Info

ABSTRACT

In the era of digitalisation, working parents today rely more than ever on electronic gadgets as digital babysitters and device-led playtime to entertain their children. The study suggests that parents and their interactions with the home environment may contribute to shaping children's screen time. However, many struggle to keep up with the immense variety of mobile applications easily downloaded online. Thus, long screen time exposure inhibits children's ability to engage actively in physical activities as well as affects children's well-being development. This scoping review aims to identify parental perceptions of children's exposure to screens for a long period of time and how screen time affects children's well-being. Five databases, including Scopus, Web of Science (WOS), Bielefeld Academic Search Engine (BASE), Education Resources Information Center (ERIC), and ScienceDirect, were used in this research. In the initial identification stage, 218 articles were identified from the mentioned databases above. However, there were only 81 articles found to be assessed for eligibility. A total of 34 articles are eligible for analysis and reference after the exclusion and inclusion process for data collection. The findings show that the increased exposure to screens raised concerns about potential negative effects on children's emotions and behaviour.

Corresponding Author:

Noor Hanim Harun
Department of Early Childhood, Faculty of Education and Social Sciences, Universiti Selangor
Jalan Timur Tambahan, 45600, Bestari Jaya, Selangor Malaysia
Email: noorhanim@unisel.edu.my

1. INTRODUCTION

Screen time refers to the time spent on screen-based behaviours that can be performed while being sedentary or physically active [1], [2]. In recent years, there has been a notable surge in the availability of digital technologies, and screen time is how a user interacts with screens during a specific time frame. The amount of screen time has increased, while the amount of time spent on traditional TV watching has declined [3]. Hence, technology use patterns are changing from very different uses like TV viewing to more diverse uses of screens throughout the day. Although radio or television only supports a few activities, digital devices such as smartphones or tablets now provide an increasingly diverse range of activities, from radio and television to gaming, reading, and social media browsing [4]. The widespread emphasis on 'screen time' as a gauge of digital technology utilization can be attributed to the growing challenge of distinguishing between

various screen-based activities. Such emphasis renders 'screen time' valuable when expressing apprehensions regarding our increasingly digitised world. The current review will examine digital technology usage effects through the lens of screen time.

Emerging information and communication technologies (ICTs) provide end-users with many opportunities to make their lives easier. However, these technologies carry a variety of risks and threats, along with the new opportunities they offer. These risks and threats influence users of various ICT technologies in various ways. Children among these groups are the most vulnerable to risks and threats faced in online environments. Thus, children need support, and guidance is essential in ICT technology use. However, it is seen that different support methods are suggested in the literature [5], [6]. On the other hand, it is also clear that parents are responsible for keeping their children away from the risks they face or raising their awareness about what they should do in online environments [7]. Therefore, it can be said that parenting in the digital age requires parents to ensure the safety of children in online environments, along with the responsibility of organising and controlling their online activities [8].

Even though children are said to benefit from having the luxury of digital technology at their fingertips, children are increasingly exposed to devices that can access the internet, such as computers, smartphones, and tablets, beginning too early in life [9]. Many educational software programmes, apps, teaching videos, and devices are widely available to help sharpen specific learning skills and have become the reality of modern childhood. This access to digital technology, specifically "screen time," is not limited to school but is now widely available in homes. In addition, for many parents, raising a child in today's modern world of overabundance is becoming more and more challenging, leaving parents dependent on digital technology to help keep their children engaged throughout the day. Therefore, parenting in the digital age requires parents to ensure the safety of children in online environments, along with the responsibility of organising and controlling their online activities [8].

2. METHOD

This scoping review complied with the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines. The current scoping review was conducted following the methodological framework established by Arksey and O'Malley [10], which comprises five key steps: i) identifying research questions; ii) identifying relevant studies; iii) selecting relevant studies; iv) charting the data; v) collating, summarising and reporting the results.

Despite significant endeavours to mitigate children's screen time, the outcomes have fallen short of expectations. As a result, the research inquiry that underpins this scoping review, serving as the guiding principle for this study, is articulated as: "What empirical knowledge can be extracted from the current literature concerning the impact of screen time on children's well-being development?" The central research questions, as outlined in Table 1, have been structured in accordance with the research objectives set within the Population-Concept-Context (PCC) framework. The search strategy was crafted to encompass a broad range of relevant studies. This involved the utilisation of pertinent keywords associated with the influence of non-formal education on children's learning, as detailed in Table 2.

Table 1. Research questions were formed based on PCC

Research questions	Specific objectives
How are past studies on the effects of children's screen time distributed?	To explore the temporal and the setting of past studies pertaining to the effects of children's screen time.
What research design was used by past studies on the effects of children's screen time?	To determine the research method used in past studies.
What are the research aims of past studies on children's screen time?	To analyse the research purpose of past studies on children's screen time.
What are the effects of children's screen time were found in past studies?	To investigate the effects of children's screen time researched in past studies.
What are the findings of past studies on the effects of children's screen time?	To report the results of past studies on the effects of children's screen time.

The criteria for including studies were selected based on four inclusion criteria: i) articles were published from 2019 to 2023; ii) articles must be related to children; iii) articles must be written in the English language; and iv) full text available. It is important to note that protocols for scoping reviews are not eligible for publication in PROSPERO; however, the findings were reported following PRISMA guidelines [11]. Two research team members independently evaluated the titles and abstracts of all articles using predefined inclusion and exclusion criteria. The research team identified the characteristics of the articles to be extracted for summarisation and analysis. This was accomplished using a Microsoft Excel-based data

charting form with a representative sample of the reviewed studies. The finalised data charting template was structured to capture the following elements from each study: author(s), publication year, country of origin, research aims, research design, key components of the study, and research findings. The research team summarised and presented the results obtained from the charting process as outlined in Figure 1. Subsequently, they categorised the findings by assigning codes and keywords to condense and focus the data on relevant themes. These codes and keywords were then reviewed to confirm their relevance to the study and were grouped into pre-established categories.

Table 2. Search string

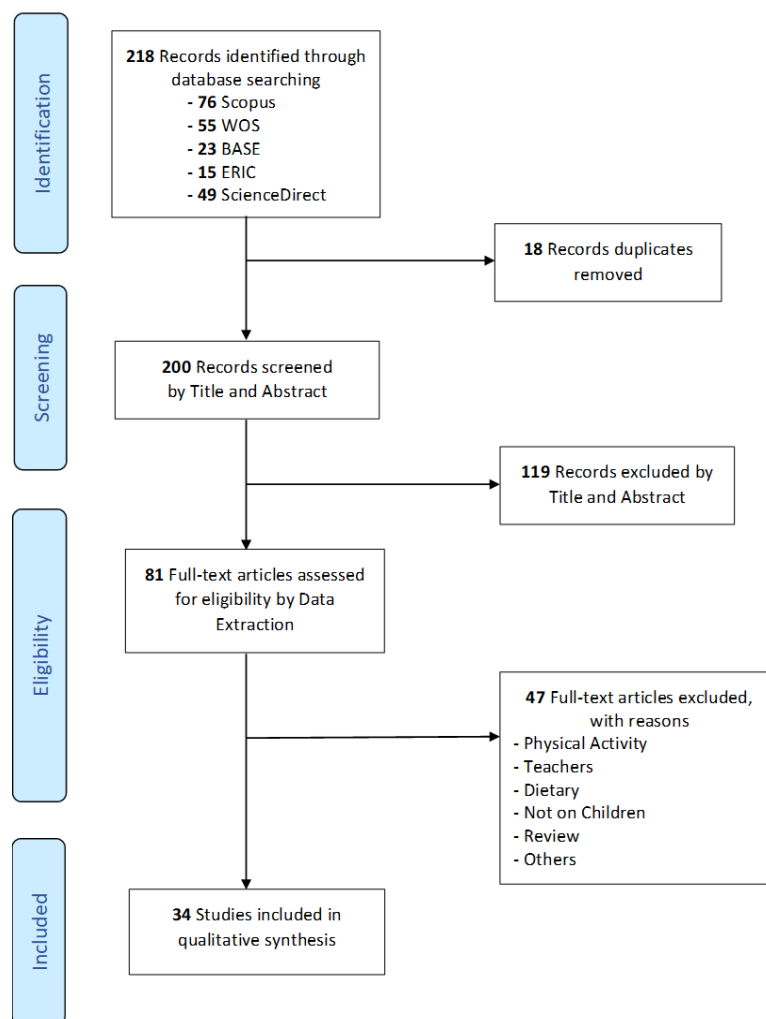| Search directory	Search string
Scopus	TITLE-ABS-KEY ("digital use" OR "screen time" AND "parent" AND "perception")
WOS	TS=("digital use" OR "screen time" AND "parent" AND "perception")
ERIC	("digital use" OR "screen time") AND ("parent") AND ("perception")
BASE	
ScienceDirect	

Figure 1. PRISMA flow chart

3. RESULTS AND DISCUSSION

The search identified 218 articles through five selected databases: Scopus, Web of Science (WOS), Bielefeld Academic Search Engine (BASE), Education Resources Information Center (ERIC), and ScienceDirect. As depicted in Figure 1, 76 titles were extracted from the Scopus database, while 55 were

determined from the WOS database. A total of 23 titles were downloaded from BASE, and 15 titles were found in ERIC databases, respectively. A total of 49 titles were found in the ScienceDirect database during the identification stage. Of the 218 articles, 18 duplicated titles were excluded, leaving 200 to be screened for eligibility. Subsequently, 119 titles were excluded based on their titles and abstracts during the screening process. Thus, 81 titles were assessed for eligibility by data extraction. Of these, 47 titles were eliminated as they did not meet the inclusion criteria. Therefore, 34 titles were identified and deemed suitable for inclusion in this review.

3.1. Distribution of past studies

The studies presented in this review were published between 2019 and 2023. In 2019, the number of studies on children's screen time was relatively limited, with n=3 [12]–[14]. The number of studies increased in 2020 with n=4 [15]–[18], indicating growing concern about the effects of screen time on children's health and development. In 2021, the number of studies significantly increased to n=9 [19]–[27]. The number of studies remained consistent in 2022 with n=9 [28]–[36], and in 2023 with n=9 studies [37]–[45] respectively. The increase in the number of studies from 2019 to 2023 indicates that research on children's screen time continued to be a priority.

The distribution of studies by continent shows that Asia has the highest number of studies, with n=14, indicating a significant focus on this topic. Europe follows this with n=12 studies and North American continents with n=7, respectively. In addition, Oceania has a relatively smaller number of studies with n=1 on children's screen time. The United States has the highest number of studies with n=7 [18], [20], [33], [38], [40], [42], [43]. India follows this with n=5 studies [15], [17], [29], [36], [41]. There are n=3 studies found in Pakistan [24], [26], [28] suggesting a growing awareness of the importance of understanding children's screen time in the country. Four countries – Germany [19], [22], Malaysia [30], [44], Ireland [21], [34] and United Kingdom [12], [27] – share a similar number of studies with n=2. Meanwhile, ten countries, namely Sri Lanka [31], France [32], Saudi Arabia [23], China [37], Australia [9], Portugal [35], Poland [13], Italy [25], Norway [14], Iran [45] and a combination of multiple European countries [16] recorded with one study each.

3.2. Research design used in past studies

Based on the accumulated 34 studies, n=20 was quantitative, followed by n=8, which was qualitative, used in studying children's screen time. Meanwhile, n=6 studies used a mixed-method research design. This review indicates that the survey is the highest research approach used for collecting data on screen time behaviours with n=15 [12], [16]–[19], [22], [23], [25], [27], [30], [32], [34], [38], [40], [44], In addition, the cross-sectional study indicates n=8 studies [28], [29], [31], [23], [35], [24], [41], [26] and interviews with n=5 studies [20], [12], [23], [43], [45] respectively. Meanwhile, n=3 studies [14], [21], [37], were found to apply the longitudinal study and n=2 studies used the descriptive study [17], [36] respectively. Other research approaches used were focus group discussions [15], Path Analysis [13] and self-reported observations [42] with one study each.

3.3. The research aim of past studies

Four categories of aims were conducted on parents' perception of children's screen time. Studies aimed to look into the impact of screen time on children's emotional well-being indicate n=5 studies [14], [21], [25], [43], [45]. In addition, n=12 studies [12], [13], [15], [16], [20], [29], [27], [30], [33], [38], [41], [44], aimed to look into how screen time significantly affects children's physical well-being. Meanwhile, a total of n=9 studies [18], [19], [31], [32], [34], [35], [37], [39], [40], look into the effects of screen time on children's social well-being. Research aimed to study the relationship between screen time and children's psychological well-being indicates n=8 studies [17], [22], [23], [24], [26], [28], [42], [36].

3.4. Main aspects of the study

The review has identified three main aspects pertaining to the impact of screen time on children's well-being and development. There were n=10 studies [28], [19], [21], [37], [35], [24], [42], [14], [26], [36], [45] investigate how children's screen time affects their overall well-being development. On the other hand, there were n=11 studies [15], [20], [29], [30], [12], [23], [38], [16], [13], [41], [44], [27] focuses on how screen time influences children's behaviour. Meanwhile, n=11 studies [18], [17], [22], [25], [31]–[34], [39], [40], [43], were conducted to explore the role of parents and caregivers in regulating and managing children's screen time.

3.4.1. Effects on children's well-being development

Mobile devices were primarily used in children aged 3 to 4 years old. This electronic device was unrelated to gender, ethnicity, or parental education. Activities of children actively using mobile devices can influence cognitive, social, and emotional development. Furthermore, it influences children's time management and social interactions in educational settings and the home environment [46]. Using mobile devices can hinder a child's ability to interact socially with family and friends, interfering with the children's emotional and social development and behaviour [47]. Using gadgets is one factor that can inhibit children's emotional development because their emotions are less stimulated. The emotional development of children is not constant, as it emerges through their interactions with the surrounding environment [48]. Children who dedicate their time to electronic media activities, such as watching television, utilising electronic devices, and engaging with the internet, tend to exhibit a higher incidence of speech delays. Consequently, this reduced interaction time diminished communication with friends and family through cell phones or similar devices [49]. Komaini [50] explains that children's motor skills can be improved through play activities because active children tend to have better motor skills than inactive children.

3.4.2. Impact on children's behaviour

A growing body of evidence demonstrates that higher levels of screen time are associated with negative emotional and behavioural problems in children and adolescents [51]–[53]. It is widely known that children are in a critical period of growth and development, especially in the first few years of their lives, with considerable plasticity [54]. Given that most infants are now exposed to the screen early in life, exploring their impact on the development of children is essential. Most studies have focused on the relationship between school-age children and adolescents' screen time and their social and emotional well-being. A small but growing number of studies have found associations between screen time and emotional and behavioural problems in infants and young children.

3.4.3. Importance of digital parenting

Digital technologies today form one of the key components of children's lives. Digital devices have quickly become cultural tools within the home, school, and community [55]. As the availability of digital technologies has increased in our daily lives, the onset age of digital technology use has become lower [56], [3], [57]. Young children regularly use digital technologies within the classroom and at home [58], making investigating young children's digital technology a fundamental interest in today's educational research [59]. Although parents view tablet computers as educationally valuable tools which are positive for children, they also have concerns regarding their potential overuse and the negative consequences of their use at home [60]. While some parents believe that digital technology usage among children may diminish their willingness to participate in non-technology-type activities, attempts have been made to alleviate such concerns.

Expanding the concept of parenting in the digital age will be helpful in this context. Parental indifference is described as a parental characteristic that prevents digital parenting interventions. This situation can happen in various ways. Parents being unaware of their children's online activities or the existing technologies they use, working parents lack time to deal with their children, or lack of basic technology literacy [61] can be included as examples. A strong parent-child relationship is also believed to prevent Internet gaming addiction significantly [62]. However, less parental control has been stated to cause higher aggression behaviours. Yaman *et al.* [63] determined that the parents' education levels and internet usage experiences do not significantly affect digital parenting levels. In addition, a study also indicated that parents who allow children to spend more than three daily hours on digital activities were associated with significant declines in children's socioemotional well-being [21].

3.5. The findings of past studies

Based on this scoping review conducted, the 34 studies reviewed provide a comprehensive view of how screen time affects various aspects of children's lives. The first findings were related to high Screen Time (ST) affecting children's social and emotional well-being in n=5 studies [19], [21], [14], [18], [45]. There were also n=5 studies [22], [23], [28], [36], [43], that found that high Screen Time resulted in children's poor behaviour. In addition, a study [12] found that high screen time affects children's eating habits while n=3 studies [41], [42], [27] indicated that high Screen Time is associated with children's health respectively. Findings showed that n=4 studies [20], [29], [30], [38] indicate that high Screen Time affects children's physical activity. Meanwhile, results on family socioeconomic status were found to be associated with children's Screen Time with n=2 studies [24], [26] while n=3 studies [31], [35], [17] indicate location setting affects children's Screen Time respectively. The highest number of studies focused on the role of parenting styles and parenting control in children's screen time with n=11 studies [15], [32], [33], [37], [39], [34], [16], [40], [13], [25], [44].

4.   CONCLUSION

During the pandemic back in 2019, the issue of screen time took on heightened significance as individuals, especially children, found themselves spending more time indoors and relying on screens for various activities. School closures have unprecedentedly altered children's as well as their families' daily lives. Continuously, some parents reported that their children's emotions and behaviour were affected as they frequently throw tantrums and bedtime is disrupted. The reported findings illustrated that the increase in screen time among children has decreased their interaction with their friends, family members and other individuals, supporting many aspects of their social and emotional development. The increased reliance on screens raised concerns about potential negative effects, including digital eye strain, sedentary behaviour, and mental health challenges. Thus, the role of parents and caregivers in regulating and managing children's screen time is deemed important. Parental control of screen use is essential for developing effective strategies to promote healthy screen time habits and overall child well-being.

REFERENCES

[1]   M. S. Tremblay *et al.*, "Sedentary behavior research network (SBRN) - terminology consensus project process and outcome," *International Journal of Behavioral Nutrition and Physical Activity*, vol. 14, no. 1, p. 75, Dec. 2017, doi: 10.1186/s12966-017-0525-8.

[2]   S. Belton, J. Issartel, S. Behan, H. Goss, and C. Peers, "The differential impact of screen time on children's wellbeing," *International Journal of Environmental Research and Public Health*, vol. 18, no. 17, p. 9143, Aug. 2021, doi: 10.3390/ijerph18179143.

[3]   Ofcom, "Children and parents: Media use and attitudes report 2018," Ofcom. [Online]. Available: https://www.ofcom.org.uk/research-and-data/media-literacy-research/childrens/children-and-parents-media-use-and-attitudes-report-2018

[4]   A. Orben, "Teenagers, screens and social media: a narrative review of reviews and key studies," *Social Psychiatry and Psychiatric Epidemiology*, vol. 55, no. 4, pp. 407–414, Apr. 2020, doi: 10.1007/s00127-019-01825-4.

[5]   S. S. Lim, "Through the tablet glass: transcendent parenting in an era of mobile media and cloud computing," *Journal of Children and Media*, vol. 10, no. 1, pp. 21–29, Jan. 2016, doi: 10.1080/17482798.2015.1121896.

[6]   S. Livingstone, A. Blum-Ross, and D. Zhang, "What do parents think, and do, about their children's online privacy?," London, UK, 2018. [Online]. Available: https://www.openaire.eu/search/publication?articleId=od_____206::e2f237d9ff9c4bbd1cfff08348d0efa4

[7]   A. N. Mansor, N. H. Zabarani, K. A. Jamaludin, M. Y. M. Nor, B. S. Alias, and A. Z. Mansor, "Home-based learning (Hbl) teacher readiness scale: Instrument development and demographic analysis," *Sustainability (Switzerland)*, vol. 13, no. 4, pp. 1–15, Feb. 2021, doi: 10.3390/su13042228.

[8]   G. Huang, X. Li, W. Chen, and J. D. Straubhaar, "Fall-behind parents? the influential factors on digital parenting self-efficacy in disadvantaged communities," *American Behavioral Scientist*, vol. 62, no. 9, pp. 1186–1206, Aug. 2018, doi: 10.1177/0002764218773820.

[9]   J. H. Danovitch, "Growing up with Google: how children's understanding and use of internet-based devices relates to cognitive development," *Human Behavior and Emerging Technologies*, vol. 1, no. 2, pp. 81–90, Apr. 2019, doi: 10.1002/hbe2.142.

[10]   H. Arksey and L. O'Malley, "Scoping studies: towards a methodological framework," *International Journal of Social Research Methodology*, vol. 8, no. 1, pp. 19–32, Feb. 2005, doi: 10.1080/1364557032000119616.

[11]   A. C. Tricco *et al.*, "PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation," *Annals of Internal Medicine*, vol. 169, no. 7, pp. 467–473, Oct. 2018, doi: 10.7326/M18-0850.

[12]   F. Nwankwo, H. D. Shin, A. Al-Habaibeh, and H. Massoud, "Evaluation of children's screen viewing time and parental role in household context," *Global Pediatric Health*, vol. 6, p. 2333794X1987806, Jan. 2019, doi: 10.1177/2333794X19878062.

[13]   M. Boberska *et al.*, "Parental strategies restricting screen use among children, screen home environment, and child screen use as predictors of child body fat: A prospective parent–child study," *British Journal of Health Psychology*, vol. 24, no. 2, pp. 298–314, May 2019, doi: 10.1111/bjhp.12354.

[14]   V. Skalická, B. Wold Hygen, F. Stenseng, S. B. Kårstad, and L. Wichstrøm, "Screen time and the development of emotion understanding from age 4 to age 8: A community study," *British Journal of Developmental Psychology*, vol. 37, no. 3, pp. 427–443, Sep. 2019, doi: 10.1111/bjdp.12283.

[15]   S. Rajaa, T. Rehman, G. Surendran, S. Sulgante, and M. Thulasingam, "An initiative to limit screen-time in children aged between 6 and 18 years in an urban area in Puducherry: a qualitative study," *International Journal of Adolescent Medicine and Health*, vol. 34, no. 5, pp. 281–287, Oct. 2022, doi: 10.1515/ijamh-2020-0087.

[16]   M. L. Miguel-Berges *et al.*, "Parental perceptions, attitudes and knowledge on European preschool children's total screen time: the ToyBox-study," *European Journal of Public Health*, Sep. 2019, doi: 10.1093/eurpub/ckz151.

[17]   P. Meena, P. Gupta, and D. Shah, "Screen time in Indian children by 15–18 months of age," *Indian Pediatrics*, vol. 57, no. 11, pp. 1033–1036, Nov. 2020, doi: 10.1007/s13312-020-2031-3.

[18]   L. Linder, N. Salcedo Potter, and S. Garrity, "The moderating role of parental strain on the relationship between child media use and regulation," *Cyberpsychology, Behavior, and Social Networking*, vol. 23, no. 6, pp. 392–399, Jun. 2020, doi: 10.1089/cyber.2019.0480.

[19]   A. Stevic and J. Matthes, "A vicious circle between children's non-communicative smartphone use and loneliness: parents cannot

do much about it," *Telematics and Informatics*, vol. 64, p. 101677, Nov. 2021, doi: 10.1016/j.tele.2021.101677.

[20] A. Eyler, L. Schmidt, A. Beck, A. Gilbert, M. Keeper, and S. Mazzucca, "Children's physical activity and screen time during COVID-19 pandemic: a qualitative exploration of parent perceptions," *Health Behavior and Policy Review*, vol. 8, no. 3, pp. 236–246, Jun. 2021, doi: 10.14485/HBPR.8.3.5.

[21] M. Bohnert and P. Gracia, "Emerging digital generations? impacts of child digital use on mental and socioemotional well-being across two cohorts in Ireland, 2007–2018," *Child Indicators Research*, vol. 14, no. 2, pp. 629–659, Apr. 2021, doi: 10.1007/s12187-020-09767-z.

[22] J. Matthes, M. F. Thomas, A. Stevic, and D. Schmuck, "Fighting over smartphones? Parents' excessive smartphone use, lack of control over children's use, and conflict," *Computers in Human Behavior*, vol. 116, p. 106618, Mar. 2021, doi: 10.1016/j.chb.2020.106618.

[23] D. Almuaigel *et al.*, "Impact of technology use on behavior and sleep scores in preschool children in Saudi Arabia," *Frontiers in Psychiatry*, vol. 12, May 2021, doi: 10.3389/fpsyt.2021.649095.

[24] A. Ishtiaq, H. Ashraf, S. Iftikhar, and N. Baig-Ansari, "Parental perception on screen time and psychological distress among young children," *Journal of Family Medicine and Primary Care*, vol. 10, no. 2, p. 765, 2021, doi: 10.4103/jfmpc.jfmpc_1720_20.

[25] L. Covolo, D. Zaniboni, J. Roncali, V. Mapelli, E. Ceretti, and U. Gelatti, "Parents and mobile devices, from theory to practice: comparison between perception and attitudes to 0–5 year old children's use," *International Journal of Environmental Research and Public Health*, vol. 18, no. 7, 2021, doi: 10.3390/ijerph18073440.

[26] M. N. Chattha, H. B. Siddiqui, N. Ahmed, M. I. Mazhar, S. Fatima, and M. M. Jamal, "Screen time in preschool children (2-5 years) in a locality of sargodha; influencing factors and parental perceptions," *Pakistan Paediatric Journal*, vol. 45, no. 1, pp. 97–102, 2021.

[27] A. Nieto and M. Suhrcke, "The effect of TV viewing on children's obesity risk and mental well-being: Evidence from the UK digital switchover," *Journal of Health Economics*, vol. 80, 2021, doi: 10.1016/j.jhealeco.2021.102543.

[28] A. Jahangeer *et al.*, "A survey of violence and vulgarity in children television programmes: A content analysis, and assessment of perceptions of parents and children (ViCTiM study)," *Journal of the Pakistan Medical Association*, vol. 72, no. 2, pp. 253–259, 2022, doi: 10.47391/JPMA.2020-774.

[29] R. Semar and N. Bakshi, "Correlation of screen time with eating behavior among school-going children aged 8 to 10 years in East Delhi, India," *Journal of Indian Association for Child and Adolescent Mental Health*, vol. 18, no. 4, pp. 283–289, 2022, doi: 10.1177/09731342221144877.

[30] Diana Raj, Norafiah Mohd Zulkefli, Zalilah Mohd Shariff, and Norliza Ahmad, "Determinants of excessive screen time among children under five years old in Selangor, Malaysia: A cross-sectional study," *International Journal of Environmental Research and Public Health*, vol. 19, no. 3560, pp. 2–11, 2022.

[31] A. Rathnasiri, H. Rathnayaka, N. Yasara, and S. Mettananda, "Electronic screen device usage and screen time among preschool-attending children in a suburban area of Sri Lanka," *BMC Pediatrics*, vol. 22, no. 1, 2022, doi: 10.1186/s12887-022-03452-6.

[32] E. Abecassis Mimoun *et al.*, "EPPOC (Ecrans en Pédopsychiatrie en Occitanie au temps du COVID): A survey in July 2020 of screen use by children of child psychiatry services in Occitania before and during French lockdown (March 17-May 11): Parent answers," *Neuropsychiatrie de l'Enfance et de l'Adolescence*, vol. 70, no. 6, pp. 308–318, 2022, doi: 10.1016/j.neurenf.2022.05.006.

[33] S. Mollborn, A. Limburg, J. Pace, and P. Fomby, "Family socioeconomic status and children's screen time," *Journal of Marriage and Family*, vol. 84, no. 4, pp. 1129–1151, Aug. 2022, doi: 10.1111/jomf.12834.

[34] B. Sciacca, D. A. Laffan, J. O'Higgins Norman, and T. Milosevic, "Parental mediation in pandemic: Predictors and relationship with children's digital skills and time spent online in Ireland," *Computers in Human Behavior*, vol. 127, p. 107081, Feb. 2022, doi: 10.1016/j.chb.2021.107081.

[35] D. Rodrigues *et al.*, "Parental perception of the social and physical environment contributes to gender inequalities in children's screen time," *Journal of Physical Activity and Health*, vol. 19, no. 2, pp. 108–117, Feb. 2022, doi: 10.1123/jpah.2021-0436.

[36] G. V. Joseph, A. M. Thomas, S. Elizabeth, S. Varghese, and J. Thomas, "The impact of screen time and mobile dependency on cognition, socialization and behaviour among early childhood students during the covid pandemic-perception of the parents," *Digital Education Review*, no. 41, pp. 114–123, 2022, doi: 10.1344/DER.2022.41.114-123.

[37] Y. Wu and S. Ye, "Longitudinal association of changes in parental correlates with screen time in Chinese preschoolers," *Journal of Physical Activity and Health*, vol. 20, no. 8, pp. 727–734, 2023, doi: 10.1123/jpah.2022-0085.

[38] M. A. Finkel *et al.*, "Longitudinal trends in parent-reported child sleep, physical activity, and screen use during the COVID-19 pandemic in New York City," *SAGE Open Medicine*, vol. 11, p. 205031212211478, Jan. 2023, doi: 10.1177/20503121221147851.

[39] K. L. Lewis, S. J. Howard, I. Verenikina, and L. K. Kervin, "Parent perspectives on young children's changing digital practices: Insights from COVID-19," *Journal of Early Childhood Research*, vol. 21, no. 1, pp. 76–90, 2023, doi: 10.1177/1476718X221145486.

[40] E. Lunkenheimer, E. D. Dunning, C. M. Diercks, and M. R. Kelm, "Parental regulation of parent and child screen-based device use," *International Journal of Behavioral Development*, vol. 47, no. 5, pp. 410–422, 2023, doi: 10.1177/01650254231179978.

[41] S. Jain, S. Shrivastava, A. Mathur, D. Pathak, and A. Pathak, "Prevalence and determinants of excessive screen viewing time in children aged 3–15 years and its effects on physical activity, sleep, eye symptoms and headache," *International Journal of Environmental Research and Public Health*, vol. 20, no. 4, 2023, doi: 10.3390/ijerph20043449.

[42] J. M. Nagata *et al.*, "Screen time and obsessive-compulsive disorder among children 9–10 years old: a prospective cohort study," *Journal of Adolescent Health*, vol. 72, no. 3, pp. 390–396, 2023, doi: 10.1016/j.jadohealth.2022.10.023.

[43] D. A. Thompson *et al.*, "Screen-related discord and dismay in low-income Mexican American families with toddlers: a qualitative study," *Journal of Pediatric Nursing*, vol. 68, pp. 60–67, 2023, doi: 10.1016/j.pedn.2022.09.009.

[44] D. Raj, N. Ahmad, N. A. M. Zulkefli, and P. Y. Lim, "Stop and play digital health education intervention for reducing excessive screen time among preschoolers from low socioeconomic families: cluster randomized controlled trial," *Journal of Medical Internet Research*, vol. 25, 2023, doi: 10.2196/40955.

[45] B. Shalani, P. Azadfallah, H. Farahani, and S. Brand, "Why do Iranian preschool-aged children spend too much time in front of screens? a preliminary qualitative study," *Children*, vol. 10, no. 7, 2023, doi: 10.3390/children10071193.

[46] G. Goldfarb and L. Krynski, "Exposure and use of mobile media devices by young children," *Archivos Argentinos de Pediatria*, vol. 114, no. 2, pp. e126–e127, 2016, doi: 10.1542/peds.2015-2151d.

[47] S. Khan and M. Khalid, "Impact of mobile phone on childhood in Pakistani society," *Journal of Computer and Information Technology*, vol. 09, no. 02, pp. 21–25, Apr. 2018, doi: 10.22147/jucit/090201.

[48] M. Suhana, "Influence of gadget usage on children's social-emotional development," in *Proceedings of the International Conference of Early Childhood Education (ICECE 2017)*, Paris, France: Atlantis Press, 2018. doi: 10.2991/icece-17.2018.58.

[49]   A. Yasin, H. Aksu, E. Özgür, and B. Gürbüz Özgür, "Speech and language delay in childhood: a retrospective chart review," *ENT Updates*, vol. 7, no. 1, pp. 22–27, Apr. 2017, doi: 10.2399/jmu.2017001004.
[50]   A. Komaini, "Fundamental motor skills of kindergarten students (a survey study of the influence of financial condition, playing activity, and nutritional status)," *IOP Conference Series: Materials Science and Engineering*, vol. 180, no. 1, 2017, doi: 10.1088/1757-899X/180/1/012156.
[51]   K. E. Gunnell *et al.*, "Examining the bidirectional relationship between physical activity, screen time, and symptoms of anxiety and depression over time during adolescence," *Preventive Medicine*, vol. 88, pp. 147–152, 2016, doi: 10.1016/j.ypmed.2016.04.002.
[52]   J. A. McDonald, C. Sroka, E. Olivares, M. Marin, M. Gurrola, and J. R. Sharkey, "Patterns of screen time among rural Mexican-American children on the New Mexico-Mexico border," *Preventing Chronic Disease*, vol. 15, no. 9, 2018, doi: 10.5888/pcd15.180070.
[53]   S. K. Tamana *et al.*, "Screen-time is associated with inattention problems in preschoolers: Results from the CHILD birth cohort study," *PLoS ONE*, vol. 14, no. 4, 2019, doi: 10.1371/journal.pone.0213995.
[54]   W. Liu *et al.*, "Early childhood screen time as a predictor of emotional and behavioral problems in children at 4 years: a birth cohort study in China," *Environmental Health and Preventive Medicine*, vol. 26, no. 1, 2021, doi: 10.1186/s12199-020-00926-w.
[55]   V. J. Rideout, "Zero to eight children's media use in America 2013." p. 40, 2013. [Online]. Available: https://www.ftc.gov/sites/default/files/documents/public_comments/california-00325 /00325-82243.pdf
[56]   S. Chaudron, "Young children (0-8) and digital technology: a qualitative exploratory study across seven countries," *Technical report by the Joint Research Centre of the European Commission*, 2015. doi: 10.2788/00749.
[57]   V. Rideout, AzmanJaka, and Common Sense Media, "The common sense census: media use by kids age zero to eight, 2020," 2020. [Online]. Available: www.commonsensemedia.org/research/the-common-sense-census-media-use-by-kids-age-zero-to-eight-2017.
[58]   O. N. Saracho, "Developmentally-appropriate technology and interactive media in early childhood education," in *Young Children and Families in the Information Age: Applications of Technology in Early Childhood*, K. L. Heider and M. R. Jalongo, Eds., 2015, pp. 183–205. doi: 10.1007/978-94-017-9184-7_11.
[59]   C. K. Blackwell, A. R. Lauricella, and E. Wartella, "Factors influencing digital technology use in early childhood education," *Computers and Education*, vol. 77, pp. 82–90, 2014, doi: 10.1016/j.compedu.2014.04.013.
[60]   M. M. Neumann, G. Merchant, and C. Burnett, "Young children and tablets: the views of parents and teachers," *Early Child Development and Care*, vol. 190, no. 11, pp. 1750–1761, 2020, doi: 10.1080/03004430.2018.1550083.
[61]   A. Marsh, J. Downs, and L. Cranor, "Experts' views on digital parenting strategies," *Carnegie Mellon University*, vol. 3, no. 3, pp. 37–56, 2018, doi: 10.1184/R1/6467891.v1.
[62]   K. Kim and K. Kim, "Internet game addiction, parental attachment, and parenting of adolescents in South Korea," *Journal of Child and Adolescent Substance Abuse*, vol. 24, no. 6, pp. 366–371, 2015, doi: 10.1080/1067828X.2013.872063.
[63]   F. Yaman, O. Dönmez, Y. Akbulut, I. K. Yurdakul, A. N. Çoklar, and T. Güyer, "Exploration of parents' digital parenting efficacy through several demographic variables," *Egitim ve Bilim*, vol. 44, no. 199, pp. 149–172, 2019, doi: 10.15390/EB.2019.7897.

BIOGRAPHIES OF AUTHORS

Rita Wong Mee Mee 🔴 8 SC P ◗ is a TESL Lecturer at the Centre for Language at the National Defence University of Malaysia (NDUM). She received her Doctorate in Education (Ed.D) degree from Universiti Selangor. She specialises in Materials Development, Game-Based Learning and Early Childhood Literacy. She can be contacted at email: ritawong@upnm.edu.my.

Noor Hanim Harun 🔴 8 SC ◗ is a ECE Lecturer at the Faculty of Education and Social Sciences, Universiti Selangor (UNISEL). She specialises in Counseling Psychology and Early Childhood Education. She can be contacted at email: noorhanim@unisel.edu.my.

Lim Seong Pek is a TESL Lecturer at the Faculty of Education and Social Sciences, Universiti Selangor (UNISEL). He received his Doctorate in Education (Ed.D) degree from Universiti Selangor. He specialises in Media Literacy, Multimodality and Teacher Education. He can be contacted at email: limsp@unisel.edu.my.

Suzulaikha Mohamed is a TESL Lecturer at the Faculty of Education and Social Sciences, Universiti Selangor (UNISEL). She specialises in English Language Studies and Language Teaching Methodology. She can be contacted at email: suzulaikha@unisel.edu.my.

Tengku Shahrom Tengku Shahdan is an Assoc. Prof. at Albukhary International University (AIU). He is currently the Dean of the School of Education and Human Sciences. He specialised in Instructional Design and eLearning Systems. He can be contacted at email: shahrom.shahdan@aiu.edu.my.

Anisa Ahmad is the President of the Association of Registered Childcare Providers Malaysia (PPBM). She is a trainer for PPBM, and in-house trainer and advisor for Tulip Tots Child Care Center, with experience in early childhood care and education for more than 15 years. She can be contacted at email: anisaahmad.ppbm@gmail.com.