Parental Digital Literacy: Protecting Children from Online Risks

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Abstract

The rapid advancement of digital technology has transformed how children access and use the internet, offering opportunities for learning and socialization while exposing them to risks such as cyberbullying and harmful content. This study examines parental digital literacy across six dimensions: knowledge of technology, security settings, usage policies, monitoring activities, communication, and risk awareness. Data were collected from 179 mothers with children under 15 through structured questionnaires. Findings reveal generational and educational disparities in digital literacy. Generation Y demonstrated strong technological knowledge and security practices but lacked awareness of digital risks. Generation Z excelled in monitoring activities but faced challenges in communication and usage policies, while Generation X showed strength in communication and risk awareness but required improvement in security settings and practical technology use. Educationally, mothers with advanced degrees had greater knowledge and risk awareness but struggled with application skills, while those with lower education levels exhibited lower proficiency overall. This study highlights the need for tailored interventions, including cross-generational training and targeted educational programs, to address gaps in parental digital literacy. These efforts aim to foster safer digital environments for children. Future research should explore socioeconomic factors and evaluate the long-term impact of interventions to enhance digital parenting.

Keywords: Parental digital literacy, online safety, digital parenting, generational differences, child protection

Literasi Digital Orang Tua: Melindungi Anak dari Risiko Online

Abstrak

Perkembangan teknologi digital yang pesat telah mengubah cara anak-anak mengakses dan menggunakan internet, menawarkan peluang untuk belajar dan bersosialisasi, namun juga membawa risiko seperti perundungan siber dan paparan konten negatif. Penelitian ini menganalisis literasi digital orang tua dalam enam dimensi: pengetahuan teknologi, pengaturan keamanan, kebijakan penggunaan, pemantauan aktivitas, komunikasi, dan kesadaran risiko. Data dikumpulkan dari 179 ibu dengan anak di bawah usia 15 tahun melalui kuesioner terstruktur. Hasil penelitian menunjukkan adanya perbedaan literasi digital berdasarkan generasi dan tingkat pendidikan. Generasi Y memiliki pengetahuan teknologi dan pengaturan keamanan yang baik, tetapi kurang dalam kesadaran risiko. Generasi Z unggul dalam pemantauan aktivitas anak, namun memiliki tantangan dalam kebijakan penggunaan dan komunikasi. Sementara itu, Generasi X menunjukkan kekuatan dalam komunikasi dan kesadaran risiko, tetapi memerlukan peningkatan pada pengaturan keamanan dan penerapan teknologi. Berdasarkan pendidikan, ibu dengan gelar lanjutan memiliki pengetahuan dan kesadaran risiko yang lebih tinggi, namun kesulitan dalam keterampilan praktis, sementara ibu dengan pendidikan lebih rendah menunjukkan kemampuan yang lebih terbatas. Penelitian ini menekankan pentingnya intervensi yang terarah, seperti pelatihan lintas generasi dan program edukasi, untuk meningkatkan literasi digital orang tua. Penelitian lanjutan perlu mengeksplorasi faktor sosial-

ekonomi dan dampak jangka panjang intervensi dalam meningkatkan pengasuhan digital yang aman bagi anak-anak.

Kata Kunci: Literasi digital orang tua, keamanan online, pengasuhan digital, perbedaan generasi, perlindungan anak.

1. Introduction

The rapid development of digital technology has significantly transformed various aspects of life, including how children access and use the internet. The ease of access to digital devices and online connectivity offers substantial opportunities for children to obtain information, learn, and engage in virtual socialization. However, alongside these benefits, there are inherent safety risks for children. Online dangers, such as cyberbullying, sexual exploitation, exposure to negative content, and internet addiction, pose serious threats that parents must continuously address. According to data from Indonesia's Central Statistics Agency (BPS) in 2022, 66.48% of children aged over five years had accessed the internet [1]. This statistic indicates that the penetration of digital technology has extended to children from an early age. While the internet provides various benefits, inadequate supervision exposes children to heightened vulnerabilities in the digital realm.

In this digital era, parents play a critical role in guiding their children in the use of technology. Research has shown that parental digital literacy significantly influences their ability to oversee their children's online activities. Studies by Chaudron et al. and Livingstone et al. found that higher levels of parental digital literacy are associated with better protection of children from online risks and the promotion of safe technology use [2] [3]. Digital literacy encompasses basic technological skills, understanding appropriate online content, utilizing parental control tools, and knowledge of how to guide children in safe internet practices [4] [5]. The level of parental digital literacy greatly impacts their effectiveness in providing protection and guidance for their children’s internet use [6].

This study aims to analyze the level of parental digital literacy in protecting children from online threats and to assess the extent to which parents possess digital literacy skills to implement effective educational strategies. These strategies are intended to enhance parents' abilities to ensure their children’s online safety. The findings of this research are expected to contribute to the literature on the importance of digital literacy in parenting within the digital age. Furthermore, they may serve as a foundation for developing more effective child protection policies for the internet.

2. Research Method

This study employs a quantitative approach aimed at measuring the level of parental digital literacy through data collected using questionnaires. The objective is to provide a clear depiction of the current state of parental digital literacy, particularly in the context of safeguarding children from online risks.

2.1 Research Instrument

This study aims to assess the level of digital literacy among parents in protecting their children from the risks associated with gadget use and online activities. The research employs a survey instrument with responses measured on a Likert scale. The instrument was developed and utilized based on references [7] [8] [9] [10] [11] [12] from several prior studies.

The study evaluates parental digital literacy across six dimensions: knowledge of technology, security settings, gadget usage policies, monitoring of online activities, communication with children, and understanding of risks. Each dimension is assessed using four questions. The survey questions are detailed in Table 1.

Table 1 Survey Questions

No	Dimension	Questions
I	**Knowledge of Technology**	
1	A1	I understand how to use technological devices such as smartphones, tablets, or computers.
2	A2	I know the applications, platforms, or social media my child frequently uses.
3	A3	I understand how the applications used by my child work.
4	A4	I stay updated on the latest technology and applications my child uses.
II	**Security Settings**	
1	B1	I know how to enable parental controls on the devices my child uses.
2	B2	I regularly check the security settings on my child's gadgets.
3	B3	I set passwords or PIN codes for my child's devices.
4	B4	I use specialized applications or software to monitor my child's online activities.
III	**Usage Policies**	
1	C1	I establish screen time limits for my child's daily gadget usage.
2	C2	I strictly enforce rules regarding gadget use at home.
3	C3	I have specific rules about gadget and internet use for my child (e.g., no online activity after a certain time).
4	C4	My child violates the gadget usage rules I have set.
IV	**Monitoring Activities**	
1	D1	I check my child's gadget activities, browsing history, or online activities.
2	D2	I know with whom my child communicates online.
3	D3	I am aware of the content my child accesses on the internet.
4	D4	After monitoring their gadget/online activities, I discuss these activities with my child.
V	**Communication with Children**	
1	E1	I talk to my child about gadget and internet use.
2	E2	My child feels comfortable discussing problems they face on the internet with me.
3	E3	I have a good quality of communication with my child regarding gadget use.
4	E4	My child openly shares their online experiences with me.
VI	**Understanding Risks**	
1	F1	I understand the risks my child faces online (e.g., cyberbullying, online predators, negative content).
2	F2	I educate or explain to my child the dangers of the internet.
3	F3	I discuss internet safety topics with my child.
4	F4	I assess whether my child is prepared to handle risks from their online activities.

2.2 Sample

This study employed a quantitative approach with purposive sampling, selecting respondents who were mothers with children under the age of 15. The questionnaire was distributed to participants in several classes taught by the author. Class participants shared the questionnaire link with their contacts personally and through WhatsApp groups.

Respondents completed the online questionnaire using the Google Form platform. Out of 198 total respondents, only 179 responses were deemed valid. Seven respondents were excluded for not meeting the criteria of having children under 15 years old, and the remaining invalid responses were excluded due to inconsistent answers to control questions embedded in the questionnaire. Valid respondents came from diverse educational backgrounds and generational groups. By generation, there were 53 respondents from

Generation X, 91 from Generation Y, and 35 from Generation Z. By education level, the respondents included 73 with high school education, 89 with D3/bachelor's degrees, and 17 with master's degrees. The demographic distribution of the respondents is presented in Table 2 below.

Table 2 Demographic distribution of respondents

No	Demography	Number	Percentage
I	**Age**		
	Gen X	53	29,61%
	Gen Y	91	50,84%
	Gen Z	35	19,55%
II	**Education Background**		
	High School	73	40,78%
	Diploma/Bacherlor	89	49,72%
	Master	17	9,50%
III	**Number of children under 15**		
	1	104	58,10%
	2	54	30,17%
	3	17	9,50%
	4	4	2,23%
	Total	**179**	**100,00%**

2.3 Validity and Realibility Test

The validity test was conducted to ensure that each dimension in the research instrument has a significant correlation with the total score. The calculated r-value (r-calculated) was compared to the critical r-value (r-table) at a 5% significance level ($\alpha = 0.05$) with 40 respondents. Based on the r-distribution table, the critical r-value used was 0.312. The results of the validity test for each dimension are presented in Table 3.

Table 3 Validity test

Dimension	R-Calculated	R-Table	Description
Knowledge of Technology	0.621	0.312	Valid
Security Settings	0.612	0.312	Valid
Usage Policies	0.644	0.312	Valid
Monitoring Activities	0.715	0.312	Valid
Communication with Children	0.627	0.312	Valid
Understanding Risks	0.647	0.312	Valid

From the table above, all dimensions have an r-calculated value greater than the r-table value (0.312). Therefore, all items in these dimensions are considered valid and can be used for measurement in this study. The reliability test was conducted to assess the internal consistency of the research instrument for each dimension using Cronbach's Alpha. The results are summarized and shown in Table 4.

Table 4 Reability test

Dimension	**Cronbach's Alpha**	**Reliability Description** [13]
Knowledge of Technology	0.859	Very Good
Security Settings	0.747	Acceptable
Usage Policies	0.746	Acceptable
Monitoring Activities	0.798	Good
Communication with Children	0.777	Good
Understanding Risks	0.767	Good

The reliability test of the research instrument, based on Cronbach's Alpha, demonstrates that the instrument possesses good reliability across all dimensions. The "Knowledge of Technology" dimension, with a Cronbach's Alpha of 0.859, exhibits excellent reliability. This high value indicates strong internal consistency among the items, suggesting they are closely related and effective in measuring technological knowledge. The instrument for this dimension can reliably produce consistent results.

The "Security Settings" dimension has a Cronbach's Alpha of 0.747, which falls within the acceptable range. This dimension demonstrates sufficient internal consistency to assess parents' ability to manage the security of technological devices. However, there is room for improvement through minor revisions or refinements to specific items. Similarly, the "Usage Policies" dimension, with a Cronbach's Alpha of 0.746, also displays acceptable reliability. Although reliable, slight adjustments to a few questions could enhance its consistency.

The "Monitoring Activities" dimension achieves a Cronbach's Alpha of 0.798, reflecting good reliability. This dimension is robust in assessing efforts to monitor children's online activities, with no significant revisions required to improve its reliability. The "Communication with Children" dimension, with a Cronbach's Alpha of 0.777, also demonstrates good internal consistency, indicating that the items effectively measure the quality of communication between parents and children regarding technology use.

Finally, the "Understanding Risks" dimension, with a Cronbach's Alpha of 0.767, also shows good reliability. The items are well-suited to measure parents' understanding of online risks, though minor improvements could be considered to further enhance reliability.

Overall, the Cronbach's Alpha values across all dimensions range from 0.746 to 0.859, indicating the instrument's reliability is adequate to excellent. Dimensions with values exceeding 0.8, such as "Knowledge of Technology" and "Monitoring Activities," demonstrate a high degree of reliability. Other dimensions, despite having slightly lower values (0.746–0.777), remain within the acceptable range, making the instrument generally suitable for use in the study. Small revisions to the dimensions with lower reliability scores could further refine the instrument's quality.

3. Result and Discussion

3.1 Age at which Children Start using Gadgets

This study analyzed the age at which children are permitted to use gadgets, based on the generational background of parents, as well as the trends in parental decision-making regarding gadget usage. The research aims to illustrate the attitudes of parents from different generations (Generations X, Y, and Z) in granting permission for their children to use gadgets and how the child's age influences these decisions. The findings provide insights into generational differences and parental strategies in managing gadget use.

From the data presented in Table 5, it can be concluded that Generation X mothers show a higher tendency to allow their children to use gadgets at the age of 7 to 11 years (12.85%) compared to other age groups. Only 1.12% of Generation X mothers permit gadget use under the age of 3, indicating a more conservative attitude toward early gadget exposure. Conversely, Generation Y mothers tend to be more flexible, with the highest percentage permitting gadget use at 4 to 6 years (17.32%), followed by 7 to 11 years (14.53%). This generation also demonstrates a significant percentage (7.82%) permitting gadget use under the age of 3, suggesting that some Generation Y parents are more open to early gadget introduction.

Table 5 Distribution of age at which children are allowed to use gadgets based on parental age

Age	Not Yet		<=3		4 - 6		7 - 11		12 - 15		>15		Total	
Gen X	0	0,00%	2	1,12%	12	6,70%	23	12,85%	15	8,38%	1	0,56%	53	29,61%
Gen Y	3	1,68%	14	7,82%	31	17,32%	26	14,53%	17	9,50%	0	0,00%	91	50,84%
Gen Z	4	2,23%	6	3,35%	3	1,68%	10	5,59%	10	5,59%	2	1,12%	35	19,55%
Total	7	3,91%	22	12,29%	46	25,70%	59	32,96%	42	23,46%	3	1,68%	179	100,00%

Generation Z mothers display a unique pattern with a relatively even distribution across age groups, although the highest percentage is observed in the 7 to 11 years category (5.59%). They appear to be more liberal in introducing gadgets at an early age, with 3.35% allowing usage under the age of 3. Generation Y dominates decision-making regarding gadget use, accounting for 50.84% of the total respondents, compared to Generation X (29.61%) and Generation Z (19.55%). This dominance suggests that Generation Y parents are the primary decision-makers in this context. While Generation X generally adopts a more conservative approach, they significantly influence the 7 to 11 years (12.85%) and 12 to 15 years (8.38%) age groups. On the other hand, Generation Z, representing only 19.55% of the total respondents, demonstrates a more progressive and evenly distributed pattern in granting permission for gadget use across age ranges.

The overall data shows diverse patterns of gadget use across age groups. Notably, the 7 to 11 years age range emerges as the most common period for introducing gadget use, with a total percentage of 32.96%. This consistency across generations indicates that this age is widely considered the most appropriate time for children to begin using gadgets. However, according to recommendations from the American Academy of Pediatrics (AAP), gadget use at this age should be closely monitored to ensure safety and optimal benefits [14]. In contrast, only 12.29% of children under 3 years use gadgets, reflecting increased parental awareness of the potential negative impacts of gadget use on early childhood development. Both the AAP and the World Health Organization (WHO) strongly recommend strict limitations or even prohibitions on gadget use at this age [15], [16].

For early adolescents (12–15 years), gadget use rises to 23.46%, reflecting the need to support education and communication. However, experts warn that without adequate supervision, children in this age group are vulnerable to risks such as addiction, exposure to inappropriate content, or cyberbullying [17]. Therefore, while most mothers demonstrate an awareness of the potential dangers of gadget use, targeted supervision is necessary, particularly for the 7–15 years age group, to fulfill the protective role of parents in fostering healthy digital development for their children. This study reveals generational differences in parental decision-making patterns regarding children's gadget use, aligning with previous findings on parental attitudes toward technology for children. Generation X and Y parents tend to be more cautious, granting permission for gadget use at older ages. This trend is consistent with the findings of Livingstone and Helsper [17], who noted that parents with limited technological experience are more likely to restrict their children's gadget use to mitigate the risks of exposure to inappropriate content. In contrast, Generation Z parents exhibit a more even distribution across all age ranges, reflecting a more permissive attitude. This aligns with Blum-Ross and Livingstone's research [18], which found that younger parents often view technology as a tool to support learning and communication, particularly in an increasingly digital ecosystem.

The general trend of introducing gadgets at ages 7 to 11 suggests that parents perceive this period as suitable for leveraging technology for education, communication, or entertainment. This finding supports previous study [19], which observed a significant rise in gadget use among primary school children due to the increasing need for access to relevant information. However, while the proportion of gadget use among children under three years old remains relatively small, attention should be given to its potential impact on child development. The American Academy of Pediatrics (AAP) and the World Health Organization (WHO) warn that early exposure to screens may hinder social, emotional, and cognitive development [14] [15]. This study makes a significant contribution to the literature by highlighting generational patterns in parental behavior regarding children's technology use. It also opens avenues for further analysis of how these patterns are influenced by socioeconomic factors, educational levels, and parental awareness of the risks and benefits of technology. These findings are consistent with prior study [20], that emphasized that socioeconomic and educational factors play critical roles in household technology-related decisions.

In addition to analyzing the distribution of children’s ages at which gadget use is permitted based on parental age, this study also examines the distribution according to the educational level of the parents. The analysis aims to identify patterns in parental decision-making behavior regarding the introduction of

gadgets to children. The data on the age at which children are allowed to use gadgets, categorized by the educational level of mothers, is presented in Table 6

Table 6 Distribution of age at which children are allowed to use gadgets based on parental education

Education	Not Yet		<=3		4 - 6		7 - 11		12 - 15		>15		Total	
High School	4	2,23%	8	4,47%	13	7,26%	28	15,64%	20	11,17%	0	0,00%	73	40,78%
Diploma/Bachelor	3	1,68%	13	7,26%	26	14,53%	24	13,41%	20	11,17%	3	1,68%	89	49,72%
Master	0	0,00%	1	0,56%	7	3,91%	7	3,91%	2	1,12%	0	0,00%	17	9,50%
Total	7	3,91%	22	12,29%	46	25,70%	59	32,96%	42	23,46%	3	1,68%	179	100,00%

The analysis of the data in Table 6 reveals significant trends in parental decision-making regarding the age at which children are permitted to use gadgets, categorized by the educational level of mothers. Parents with varying levels of education demonstrate distinct patterns in granting gadget access to their children.

Parents with a high school education represent the largest proportion (40.78%) of the sample. This research found that they are most likely to permit gadget use for children aged 7 to 11 years (15.64%), with a smaller proportion allowing usage for children aged 12 to 15 years (11.17%). Only 4.47% of parents in this category allow children under three years old to use gadgets, indicating a relatively cautious approach for younger ages. In contrast, parents with a bachelor's degree comprise the majority of the sample (49.72%) and show a relatively balanced distribution across age groups. They exhibit a higher tendency to allow children aged 4 to 6 years to use gadgets (14.53%), followed by 7 to 11 years (13.41%). Interestingly, 7.26% of this group permits gadget use for children under three years old, reflecting a slightly more lenient attitude compared to parents with high school education. Parents with a master's degree, who constitute the smallest proportion of the sample (9.50%), display the most conservative approach. They predominantly permit gadget use for children aged 4 to 6 years (3.91%) and 7 to 11 years (3.91%). Only 0.56% of parents in this group allow gadget use for children under three years old, indicating heightened caution towards early exposure to technology.

The findings align with prior studies, such as Kabali et al. [21], which observed that higher parental education levels are associated with more structured and cautious approaches to children's gadget use. Parents with advanced degrees often emphasize the potential developmental risks of early screen exposure, consistent with recommendations from the American Academy of Pediatrics (AAP) and the World Health Organization (WHO) [22] [15]. However, the current study contrasts with Blum-Ross and Livingstone [23], which suggested that educated parents increasingly view technology as a tool for early learning. While this study corroborates the cautiousness among highly educated parents, it also highlights that those with bachelor's degrees are more open to introducing gadgets for younger children, potentially influenced by the growing integration of technology into educational environments. The results underscore the importance of tailoring parental education programs on digital literacy to align with varying levels of parental education. Awareness campaigns emphasizing the developmental impacts of early gadget use could be particularly targeted at parents with lower educational levels, who are less cautious about early exposure.

3.2 Measurement of Parental Digital Literacy

Parental digital literacy is a critical factor in understanding how parents guide and protect their children in the digital era. In this study, parental digital literacy is measured through a structured questionnaire designed to assess six key dimensions: knowledge of technology, security settings, gadget usage policies, monitoring activities, communication with children, and understanding of online risks. Each dimension consists of a set of questions aimed at evaluating specific competencies and behaviors that contribute to effective digital parenting. The questionnaire utilizes a Likert scale, allowing respondents to indicate their level of agreement or frequency of specific behaviors. The results of survey shown in Table 7. From the data presented, Generation Y demonstrates the highest average score in technological knowledge (4.08), surpassing both Generation X (3.89) and Generation Z (4.02). The small standard deviations across all generations, with the lowest observed in Generation Z (0.06), indicate relatively uniform knowledge levels. However, the sub-dimension of technological application skills (A4) exhibits the lowest scores among all

generations, with Generation X scoring the lowest (3.75). This highlights the need for additional training to improve the practical application of technology. These findings align with Gui et al. [24], who argue that younger generations (Y and Z) tend to have superior digital literacy compared to older generations (X), particularly in understanding technology. In security settings, Generation Y again records the highest average score (4.13), followed by Generation Z (4.07) and Generation X (3.80). However, Generation X shows high variability in security practices, as evidenced by a large standard deviation in the sub-dimension of security application (B2) at 1.16. This inconsistency suggests challenges in mastering digital security settings. The results are consistent with van Deursen and van Dijk [25], who noted that older generations often struggle to fully understand digital security aspects.

Generation Y also leads in gadget usage policies, with an average score of 3.90, while Generation X lags slightly behind with an average score of 3.74. The weakest performance is observed in Generation X for the sub-dimension of screen time policies (C4), with the lowest score of 2.60. This finding is in line with Livingstone et al. [26], who reported that older generations often face difficulties in establishing effective screen time rules. Generation Z demonstrates the highest proficiency in monitoring children's activities, with an average score of 4.08, followed closely by Generation Y (4.06) and Generation X (3.94). The sub-dimension of online activity monitoring (D3) reflects strong engagement from Generation Z, with the highest score of 4.23. This finding aligns with Helsper and Eynon [27], who noted that younger generations are more proactive in supervising their children's digital activities, likely due to their greater familiarity with digital tools and platforms. Generation X excels in communication with children, achieving the highest average score of 4.02. In contrast, Generation Z records the lowest overall score (3.91), particularly in the sub-dimension of sensitivity to children's communication (E1), with a score of 3.77. This decline suggests a need for Generation Z parents to adopt more empathetic approaches to communication. These findings are consistent with the report by Blum-Ross and Livingstone [18], which highlights the necessity for more targeted communication strategies among parents who are themselves immersed in digital ecosystems.

Table 7 Parental digital literacy based on age

No	Dimensions	Gen X		Gen Y		Gen Z	
		Mean	Std	Mean	Std	Mean	Std
I	**Knowledge of Technology**	**3,89**	**0,11**	**4,08**	**0,10**	**4,02**	**0,06**
1	A1	4,00	0,78	3,98	0,76	4,03	0,57
2	A2	3,94	0,79	4,21	0,64	4,03	0,71
3	A3	3,87	0,76	4,08	0,67	4,09	0,66
4	A4	3,75	0,83	4,05	0,69	3,94	0,68
II	**Security Settings**	**3,80**	**0,05**	**4,13**	**0,13**	**4,07**	**0,09**
1	B1	3,77	0,91	4,13	0,64	4,03	0,71
2	B2	3,75	1,16	4,25	0,78	4,03	1,01
3	B3	3,79	0,99	4,19	0,77	4,20	0,72
4	B4	3,87	0,81	3,96	0,89	4,03	0,75
III	**Usage Policy**	**3,74**	**0,77**	**3,90**	**0,79**	**3,81**	**0,71**
1	C1	4,19	0,88	4,27	0,70	4,26	0,85
2	C2	3,91	0,99	4,25	0,64	4,06	0,87
3	C3	4,25	0,68	4,36	0,57	4,17	0,86
4	C4	2,60	1,10	2,71	0,95	2,74	1,36
IV	**Activity Monitoring**	**3,94**	**0,14**	**4,06**	**0,14**	**4,08**	**0,16**
1	D1	3,81	1,04	4,10	0,90	4,06	0,91
2	D2	4,04	0,78	4,09	0,69	4,17	0,75
3	D3	4,09	0,60	4,20	0,60	4,23	0,65
4	D4	3,83	0,98	3,87	0,95	3,86	1,00
V	**Communication with Children**	**4,02**	**0,07**	**4,01**	**0,05**	**3,91**	**0,09**
1	E1	3,98	0,97	4,07	0,85	3,77	1,00
2	E2	3,94	0,77	3,98	0,70	3,94	0,97
3	E3	4,06	0,69	4,03	0,59	3,94	0,80
4	E4	4,09	0,69	3,97	0,62	3,97	0,82
VI	**Understanding Risk**	**4,11**	**0,30**	**4,01**	**0,33**	**3,95**	**0,11**
1	F1	4,26	0,84	4,23	0,76	4,06	0,76

2	F2	4,43	0,82	4,32	0,81	4,03	0,82
3	F3	4,00	0,98	3,88	0,96	3,83	0,86
4	F4	3,75	1,04	3,60	0,85	3,89	0,76

Generation X also leads in risk awareness, with the highest average score of 4.11, underscoring their heightened understanding of potential digital dangers. In contrast, Generation Y records the lowest score in the sub-dimension of gadget risk awareness (F4), with an average of 3.60. This observation supports the findings of van Deursen et al. [28], which emphasize that educational attainment and practical experience significantly influence individuals' awareness of technological risks. Generation Y excels in technological knowledge and security settings but demonstrates a relative weakness in awareness of the risks associated with gadget use. In contrast, Generation Z stands out in monitoring children's activities but requires improvement in establishing gadget usage policies and fostering effective communication with their children. Generation X shows strength in communication and understanding risks but needs enhancement in security settings and the practical application of technology.

To address these generational differences, cross-generational training programs are recommended. These programs should focus on improving security settings for Generation X and developing robust gadget usage policies for Generation Z. Additionally, education on screen-time policies should be targeted at both Generation X and Z to enhance awareness of the importance of limiting screen time. A particular emphasis should be placed on Generation Z, guiding them to adopt empathetic communication strategies with their children. By implementing these tailored approaches, parents across all generations can be better equipped to safeguard their children from the potential dangers of gadgets and online activities, fostering a safer and more responsible digital environment. This study also analyzes mothers' digital literacy capabilities in protecting their children from the dangers of gadget use and online activities, categorized by educational level. The data, as presented in Table 8, highlights distinct trends across different levels of education.

Mothers with a higher level of education (Master's degree) exhibit the highest scores in technological knowledge (4.24) compared to those with Bachelor's/Diploma degrees (4.07) and High School education (3.89). These findings align with Gui et al. [24], who found that digital literacy is positively correlated with educational attainment, as individuals with higher education often have better access to resources and technological training. However, further analysis reveals a lower score for the sub-dimension of technological application skills (A4) among mothers with Master's degrees (3.94) compared to those with Bachelor's/Diploma degrees (4.02). This supports the findings of van Deursen and van Dijk [25], who noted that while individuals with higher education levels generally have a better understanding of technology, they often lack the practical skills needed for day-to-day applications.Interestingly, the standard deviation of technological knowledge among mothers with Master's degrees (0.22) is higher than that of other groups, indicating greater variability in competency levels. This observation aligns with Helsper and Eynon [27], who suggested that digital literacy is not solely influenced by education but also by factors such as personal experience, social environment, and age. These results emphasize the need for practical, relevant technological application training, even for those with advanced educational qualifications. In terms of security settings, mothers with Bachelor's/Diploma degrees scored the highest average (4.05) with the lowest standard deviation (0.07), indicating consistent understanding and application of security measures. In contrast, mothers with Master's degrees scored lower on average (3.76), particularly in data security practices. This finding is consistent with van Deursen and van Dijk's [25] research, which highlighted that higher education does not always guarantee adequate practical security skills.

For gadget usage policies, mothers with Bachelor's/Diploma degrees again outperformed others, with the highest average score (3.90), while those with Master's degrees scored the lowest (3.68). Across all educational levels, the sub-dimension of screen time policies revealed particularly low scores, especially for mothers with Master's degrees (2.41). This underscores the need to raise awareness about the importance of screen time restrictions, corroborating findings by Livingstone et al. [26], which showed that parents often struggle to enforce effective screen time limits regardless of their education.

Table 8 Parental digital literacy based on education

No	Dimension	High School	Diploma/Bachelor	Master

		Mean	Std	Mean	Std	Mean	Std
I	**Knowledge of Technology**	**3,89**	**0,07**	**4,07**	**0,05**	**4,24**	**0,22**
1	A1	3,82	0,63	4,04	0,80	4,47	0,51
2	A2	3,99	0,59	4,15	0,81	4,29	0,59
3	A3	3,90	0,65	4,07	0,75	4,24	0,56
4	A4	3,85	0,68	4,02	0,75	3,94	0,90
II	**Security Settings**	**4,01**	**0,13**	**4,05**	**0,07**	**3,89**	**0,07**
1	B1	3,85	0,76	4,12	0,74	4,06	0,75
2	B2	4,08	0,94	4,10	1,01	3,76	0,90
3	B3	4,14	0,63	4,01	1,01	4,12	0,78
4	B4	3,96	0,73	3,98	0,90	3,71	0,92
III	**Usage Policy**	**3,78**	**0,83**	**3,90**	**0,71**	**3,68**	**0,88**
1	C1	4,15	0,81	4,33	0,70	4,24	1,03
2	C2	4,18	0,63	4,12	0,84	3,76	1,25
3	C3	4,26	0,67	4,31	0,65	4,29	0,77
4	C4	2,55	1,11	2,85	1,07	2,41	0,87
IV	**Activity Monitoring**	**4,00**	**0,17**	**4,07**	**0,11**	**3,94**	**0,17**
1	D1	3,92	0,98	4,10	0,92	3,88	0,93
2	D2	4,14	0,69	4,08	0,79	3,94	0,56
3	D3	4,15	0,59	4,19	0,64	4,18	0,53
4	D4	3,79	1,05	3,92	0,86	3,76	1,09
V	**Communication with Children**	**3,96**	**0,09**	**4,01**	**0,09**	**4,03**	**0,16**
1	E1	3,82	1,11	4,13	0,74	3,88	0,78
2	E2	4,01	0,68	3,92	0,86	3,94	0,75
3	E3	4,01	0,51	3,99	0,76	4,24	0,66
4	E4	4,00	0,65	4,00	0,72	4,06	0,66
VI	**Understanding Risk**	**3,96**	**0,29**	**4,07**	**0,26**	**4,10**	**0,41**
1	F1	4,00	0,82	4,31	0,73	4,53	0,72
2	F2	4,33	0,78	4,27	0,85	4,29	0,92
3	F3	3,88	0,96	3,91	0,95	4,00	0,94
4	F4	3,63	0,96	3,79	0,85	3,59	0,87

In monitoring children's activities, mothers with Bachelor's/Diploma degrees achieved the highest average score (4.07), whereas those with Master's degrees scored lower (3.94). The sub-dimension of activity monitoring revealed similar trends, with the lowest score recorded for mothers with Master's degrees (3.76). This reduced engagement may be attributed to factors such as professional commitments or a lower prioritization of direct monitoring, as suggested by Helsper and Eynon [27]. Regarding communication with children, mothers across all educational levels demonstrated strong communication abilities, with average scores exceeding 4.00. Mothers with Master's degrees achieved the highest score in technology-based communication (4.24), supporting Gui et al.'s [24] assertion that individuals with higher education levels are more adept at utilizing technology for communication purposes.

Finally, in risk awareness, a positive trend correlates with educational level, with mothers holding Master's degrees scoring the highest average (4.10). However, the sub-dimension of gadget risk awareness received low scores across all education levels, particularly among mothers with Master's degrees (3.59). These findings highlight the need for targeted educational approaches to enhance risk awareness, as emphasized by Blum-Ross and Livingstone [18].

4. Conclusion

This study presents a detailed examination of parental digital literacy and its vital role in safeguarding children from the risks associated with gadgets and online activities. The findings highlight notable generational and educational disparities in digital literacy, offering significant insights into improving parental guidance in the digital age. Generation Y demonstrates strong technological knowledge and proficiency in security settings, showcasing their adaptability to digital tools. However, their limited awareness of online risks reflects the need for greater understanding of digital dangers [29]. Generation Z excels in monitoring children's activities, reflecting proactive engagement with digital tools, but struggles with establishing robust gadget usage policies and fostering empathetic communication [27]. In contrast,

Generation X shows strength in communication and risk awareness but requires improvement in applying security practices and practical technological skills.

The educational dimension also plays a significant role in shaping digital literacy capabilities. Parents with Master's degrees demonstrate advanced knowledge of technology and risk awareness but face challenges in practical application skills and enforcing screen time policies. Those with Bachelor's/Diploma degrees exhibit balanced competencies, particularly in security settings and activity monitoring, while parents with high school education generally display lower proficiency, particularly in technological knowledge and monitoring activities (Gui et al., 2017) [1]. These findings underscore the critical need for targeted educational programs to address these gaps and empower parents across all educational levels to navigate digital challenges effectively.

To address these disparities, cross-generational training programs are essential, focusing on improving security practices for Generation X, strengthening gadget usage policies for Generation Z, and enhancing risk awareness for Generation Y. For parents with higher education, practical training should emphasize applying technological skills, while foundational digital literacy programs should target those with lower educational levels [23]. Furthermore, public awareness campaigns are vital to educate parents about developmental risks associated with early screen exposure and the importance of screen time limitations, as recommended by the American Academy of Pediatrics (AAP) and the World Health Organization [22] [15].

This study contributes significantly to the literature on digital parenting by identifying critical areas for improvement and providing actionable recommendations to enhance parental digital literacy. Policymakers and educators should utilize these findings to develop accessible resources and interventions tailored to the diverse needs of parents across generations and educational backgrounds. By equipping parents with the necessary skills and knowledge, these efforts can foster a safer and more responsible digital environment for children.

Future research should examine the influence of socioeconomic factors on parental digital literacy, exploring how income levels and access to digital resources impact parents' ability to guide their children in the digital realm. Longitudinal studies are needed to provide a deeper understanding of how parental digital literacy evolves over time and its long-term implications for children's online behavior and safety. Additionally, the effectiveness of tailored training programs and digital literacy interventions should be investigated to address generational and educational disparities. Expanding the scope of research to include fathers, guardians, and other caregivers will offer a more comprehensive understanding of family dynamics in digital parenting.

References

[1] S. Tri and M. Karmila, Statistik Telekomunikasi Indonesia, Jakarta: Badan Pusat Statistik, 2022.

[2] C. Stephane, D. G. Rosanna and M. Gemo, Young children (0-8) and digital technology, Europe: European Union, 2018.

[3] L. Sonia, H. Leslie, G. Anke and Ó. Kjartan, "Risks and Safety on the Internet: The Perspective of European Children. Full FINDINGS," *London School of Economics and Political Science,* 2011.

[4] H. A. Naufal, "LITERASI DIGITAL," *Jurnal Perspektif,* vol. 1, no. 2, pp. 195-202, 2021.

[5] N. Peter and J. Jeroen, "Developing scales to measure parental mediation of young children's internet use," *Learning Media and Technology,* vol. 39, no. 2, 2014.

[6] I. N. Handayani, "Peran Orang Tua pada Pengenalan Literasi Digital untuk Anak Usia Dini di Era Teknologi Digital," in *Proceedings of The 6 th Annual Conference on Islamic Early Childhood Education*, , Yogyakarta, 2022.

[7] R. Vuorikari, Y. Punie, S. Carretero G. and G. Van den Brande, "DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model.," *Publication Office of the European Union,* 2016.

[8] N. T. Maserumule, "Parent's Use of Strategies to Monitor Children's Activities Online," *Open Journal of Social Sciences, 2020, 8, ,* vol. 8, pp. 506-536 , 2020.

[9] S. Livingstone, K. Ólafsson, E. J. Helsper, F. Lupiáñez-Villanueva, G. A. Veltri and F. Folkvord, "Maximizing Opportunities and Minimizing Risks for Children Online: The Role of Digital Skills in Emerging Strategies of Parental Mediation," *Journal of Communication,* vol. 67, p. 82–105.

[10] "Digital Media and Information Literacy Framework," 2018.

[11] Ł. Tomczyk and K. Potyrała, "Parents' knowledge and skills about the risks of the digital world," *outh African Journal of Education,* vol. 41, no. 1, pp. 1-19, 2021.

[12] F. Nascimbeni, "Digital literacy for children: exploring definitions and frameworks," *UNICEF Office of Global Insight and Policy,* 2019.

[13] J. C. Nunnally, "Psychometric Theor," 1978.

[14] C. O. C. A. MEDIA, M. David Hill, M. Nusheen Ameenuddin, M. Yolanda (Linda) Reid Chassiakos, M. Corinn Cross, M. Jeffrey Hutchinson, M. Alanna Levine, M. Rhea Boyd, M. Robert Mendelson, M. Megan Moreno and M. Wendy Sue Swanson, "Media and Young Minds," *Pediatrics,* vol. 138, p. 5, 2016.

[15] W. H. Organization, Guidelines on Physical Activity, Sedentary Behaviour and Sleep for Children Under 5 Years of Age, Geneva, Switzerland: WHO, 2019.

[16] S. Domingues-Montanari, "Clinical and psychological effects of excessive screen time on children," vol. 15, pp. 16-21, 2017.

[17] L. Sonia and H. Ellen, "Balancing opportunities and risks in teenagers' use of the internet: the role of online skills and internet self-efficacy," *Sage Journals,* vol. 12, no. 2, 2009.

[18] S. L. Natalia Blum-Ross, "Sharenting, privacy and the dynamics of managing children's online identities," *Media, Culture & Society,* vol. 40, no. 7, pp. 1123-1140, 2018.

[19] K. K. Hilda, M. I. Matilde, N.-D. Rosemary, G. B. Jennifer, H. M. Sweta, P. L. Kristin and L. B. J. 1. Robert, "Exposure and Use of Mobile Media Devices by Young Children," *Pediatrics,* vol. 136, no. 6, p. 1044–1050., 2015.

[20] A. V. Elizabeth, J. R. Victoria, A. ,. W. Ellen, H. Xuan, H. L. June and S. Mi-suk, "Digital childhood: electronic media and technology use among infants, toddlers, and preschoolers," *Pediatrics,* vol. 119, no. 5, p. e1006–e1015, 2007.

[21] R. S. Kabali, M. M. Irigoyen, T. Nunez-Davis, J. G. Budacki, S. H. Mohanty, K. P. Leister and R. L. Bonner, "Exposure and Use of Mobile Media Devices by Young Children," *Pediatrics,* vol. 136, no. 6, p. 1044–1050, 12 2015.

[22] A. A. o. Pediatrics, "Media and Young Mind," *Pediatrics,* vol. 138, no. 5, 11 2016.

[23] A. G. Blum-Ross and S. M. Livingstone, Parenting for a Digital Future: How Hopes and Fears about Technology Shape Children's Lives, Oxford University Press, 2020.

[24] G. Alessandro, F. Giuseppe and C. Stefano, "Digital skills and the role of higher education: A longitudinal study," *Computers & Education,* vol. 145, p. 103731, 2020.

[25] A. J. V. Deursen and J. A. V. Dijk, "The digital divide shifts to differences in usage," *New Media & Society,* vol. 16, no. 3, pp. 507-526, 2014.

[26] M. Livingstone, S. Ólafsdóttir, A. Stoilova, L. P. Carr, R. C. d. Haan and J. F. K. S., "Parenting for a Digital Future: Survey Report," 2017.

[27] E. J. Helsper and R. Eynon, "Digital natives: where is the evidence?," *British Educational Research Journal,* vol. 36, no. 3, pp. 503-520, 2010.

[28] E. v. Deursen, J. v. Dijk and P. v. Dijk, "Digital inequality in skills and uses among the young elderly," *New Media & Society,* vol. 23, no. 7, p. 1840–1860, 2021.

[29] M. Gui, L. Fasoli and A. Carradore, "Digital skills of Internet natives: Different forms of digital literacy in the transition to higher education," *Italian Journal of Sociology of Education,* vol. 9, no. 1, p. 139–163, 3 2017.