



SAFE TECHNOLOGY USE AMONG SECONDARY SCHOOL STUDENTS: A MIXED-METHODS STUDY ON AWARENESS LEVELS AND EXPERIENCES

(Research article)

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Abstract

The aim of this study is to determine the awareness levels of secondary school students regarding safe technology use and to examine whether these levels differ according to various variables. The research was conducted using a mixed-methods design. Quantitative data were collected from 668 students during the 2025–2026 academic year using the “Awareness Scale for Safe Use of Information Technologies in Secondary School Students.” Qualitative data were obtained through semi-structured interviews with 18 students selected from different grade levels. According to the quantitative findings, the overall mean score indicated that students’ awareness levels of safe technology use were high. In terms of gender, a significant difference was found only in the dimension of “Digital Social Security and Help-Seeking,” favoring female students. Regarding grade level, the analysis revealed that 5th grade students’ awareness scores were significantly lower compared to upper grade levels. The qualitative findings, analyzed through thematic analysis, showed that students particularly considered family as a reliable source of support; they tended to prefer safe websites, avoid suspicious links, and develop self-regulation strategies for healthy technology use. In conclusion, secondary school students generally demonstrated high levels of awareness regarding safe technology use, although age and experience differences were found to influence this awareness. The findings of this study provide guiding insights for the development of educational policies and programs focusing on digital security, healthy technology use, and cyberbullying.

Keywords: Safe technology use; digital awareness; cyberbullying; secondary school students; mixed-methods

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1. Introduction

Digitalisation has fundamentally reshaped contemporary lifestyles, with far-reaching implications for learning, communication, and socialisation processes. For children and adolescents, digital technologies function not only as tools for information access but also as central platforms for entertainment, communication, gaming, and self-expression (Doğan & Gündüz, 2025). Secondary school students constitute one of the groups most intensively influenced by this transformation, given their developmental characteristics and heightened engagement with digital environments. According to data from the Turkish Statistical Institute [TSI] (2024), 91.3% of children aged 6–15 use the internet, 76.1% have a smartphone, and 74% play digital games. Children use the internet most for watching videos (83.9%), school homework (75%), and playing games (72.7%) (TSI, 2024).

Digital technologies create important opportunities for children, such as quick access to information, support for learning processes, and creative expression. Despite these opportunities, extensive engagement with digital technologies also entails a range of developmental, social, and psychological risks. For example, excessive screen use can lead to physical problems such as sleep irregularities, physical inactivity and obesity; social problems such as weakened social relationships and reduced face-to-face communication skills; and psychological problems such as distraction, anxiety, addiction and declining academic performance (Chikuvadze et al., 2024; Mustafaoğlu et al., 2018; Nagata et al., 2023; Parker et al., 2022; Yılmaz & Özkan, 2024). Managing the impact of digital technologies on children effectively places substantial responsibilities on families, teachers, and educational institutions. Guiding children on ethical behaviour, information security, and time management in the digital environment and instilling these skills at an early age is of great importance. In this regard, educational policies incorporate digital literacy and online safety into teaching programmes.

Within the Turkish educational context, the Ministry of National Education (MOE) has increasingly emphasised digital citizenship, online safety, and cyberbullying prevention in national education policies in recent years. Efforts are being made in teaching programmes to raise students' awareness of online safety, personal data protection, and ethical behaviour (MOE, 2025). However, the limited nature of practical work raises the question of the extent to which students can use these skills in their daily lives.

Furthermore, a review of the literature reveals that safe technology use and digital awareness have been addressed in studies involving teacher candidates (Doğanç & Korucu, 2020), university students (Avcı & Oruç, 2020), or parents (Karaoğlan-Yılmaz & Ezin, 2017). Nevertheless, empirical studies that examine secondary school students' awareness of safe technology use in a multidimensional and in-depth manner remain limited (Beder & Ergün, 2015; Derin & Gençoğlu, 2020; Gökçearsan & Seferoğlu, 2016).

Considering that secondary school students use digital technologies intensively, it is crucial to determine their level of awareness regarding conscious and safe technology use (Barra et al., 2015; Fulantelli et al., 2021). It is critical not only for individual security but also for the development of a culture of digital citizenship that students recognise the risks they may encounter in digital environments and develop skills in protecting their personal data,

demonstrating ethical online behaviour, and managing their digital time. In this context, this study aims to examine secondary school students' awareness levels and experiences regarding safe technology use through a mixed-methods approach. The research aims to determine students' general awareness levels through quantitative data and to analyse in depth, through qualitative data, how this awareness is reflected in daily life applications. By integrating quantitative and qualitative evidence, the study contributes to a deeper understanding of children's capacity to recognise and cope with digital risks and informs the development of protective educational strategies.

In this context, the research seeks to answer the following questions:

1. What are secondary school pupils' levels of awareness regarding the safe use of technology?
2. Do students' awareness levels differ according to gender?
3. Do students' awareness levels differ according to grade level?
4. What are students' experiences regarding the risks they encounter in digital environments, their strategies for safe use, and their views on online behaviour?

2. Method

2.1. Research Design

This research was conducted using a mixed-methods design to examine secondary school students' awareness of safe technology use. An explanatory sequential design was used in the research. Quantitative data were initially used to identify general patterns in students' awareness levels, while qualitative data subsequently provided in-depth insights into the underlying reasons for these patterns and students' lived experiences. By integrating quantitative and qualitative evidence, the study strengthened the validity of its findings and enabled a more robust and comprehensive interpretation of the results. (Creswell & Plano Clark, 2018).

2.2. Study Group

The study group for the quantitative part of the research consisted of a total of 668 secondary school students enrolled in the 2025–2026 academic year. Demographic information about the participants is presented in Table 1.

Table 1. Distribution of Students by Grade Level and Gender

Grade Level	Female (n)	Male (n)	Total (n)
5th grade	86	69	155
6th grade	106	53	159
7th grade	112	82	194
8th grade	82	78	160
Total	386	282	668

According to the table, 386 participants were female (57.8%) and 282 were male (42.2%) students. When the distribution by grade level is examined, 23.2% (n = 155) of the students are in Year 5, 23.8% (n = 159) are in Year 6, 29% (n = 194) are in Year 7, and 23.9% (n = 160) are in Year 8.

In the qualitative component of the study, semi-structured interviews were conducted with 18 students selected on a voluntary basis from different grade levels. The interview sample included 5 students from Year 5, 5 from Year 6, 4 from Year 7, and 4 from Year 8.

2.3. Data Collection Tools

2.3.1. Awareness Scale for Safe Technology Use

Quantitative data were collected using the *Awareness Scale for the Safe Use of Information Technologies for Secondary School Students* developed by Tokgöz and Serin (2025). The scale is designed to assess students' awareness of risks encountered in digital environments and has demonstrated satisfactory validity and reliability, indicating strong psychometric properties. It comprises 23 items distributed across four dimensions. The *Digital Environment Social Security and Support Seeking* dimension (3 items) measures awareness of help-seeking behaviours and the use of reliable sources in response to negative online situations. The *Digital Security and Data Protection* dimension (5 items) assesses awareness of personal data protection, password security, and safe internet practices. The *Healthy Technology Use* dimension (6 items) examines awareness related to screen time management, distraction, and protection from adverse health effects. The *Cyberbullying Awareness and Ethical Behaviour* dimension (9 items) evaluates sensitivity to cyberbullying and adherence to ethical communication norms in digital environments.

The scale, prepared in a five-point Likert format, is rated between "Always (5)" and "Never (1)". All items on the scale are positive in nature, and high scores on the scale and dimensions indicate high awareness. The construct validity of the scale is supported by exploratory and confirmatory factor analyses, while its reliability has been tested using Cronbach's Alpha coefficients. The Cronbach's Alpha reliability coefficient for the scale is .893 for the scale as a whole and ranges from .601 to .861 for the sub-dimensions.

2.3.2. Semi-Structured Interview Form

Qualitative data were collected using a semi-structured interview form developed by the researchers. The form consisted of eight open-ended questions designed to examine students' experiences with safe technology use, the digital risks they encounter, and the strategies they employ to cope with these risks. The interview questions were refined based on expert feedback, and the applicability of the form was tested with three pilot students.

Some of the questions posed to students in the form are as follows:

“When something bothers you online, who do you share it with? Why?”

“Do you consult your family or teacher before sharing a photo or video?”

“How do you distinguish between safe and unsafe websites?”

Interviews conducted with 18 students yielded in-depth insights into students' awareness of safe technology use and served to support and enrich the quantitative findings.

2.4. Data Collection Process

Quantitative data were collected online to facilitate students' easy and timely access to the scale. Before data collection, students were informed about the purpose of the study, voluntary participation was emphasised, and anonymity was ensured. Completion of the scale took approximately 10–15 minutes.

In the qualitative phase, semi-structured interviews were conducted with volunteer students representing different grade levels. A total of 18 students participated in interviews lasting an average of 15–20 minutes. Participant responses were recorded through detailed note-taking rather than audio recording. Confidentiality was maintained throughout the process, and participants were identified using code numbers (e.g., "S1", "S2").

2. 5. Data Analysis

Quantitative data were analysed using the SPSS 26.0 statistical software package. Descriptive statistics, including the arithmetic mean, standard deviation, and minimum and maximum values, were first calculated for the overall scale and its sub-dimensions. Subsequently, inferential statistical analyses were conducted to examine whether students' awareness levels differed according to the study variables. Differences based on gender were tested using an independent-samples *t*-test, whereas differences according to grade level were examined through a one-way analysis of variance (ANOVA). For all analyses, the level of statistical significance was set at .05.

Qualitative data were analysed using a thematic analysis approach following the framework proposed by Braun and Clarke (2006). Initially, all interview responses were read in detail to ensure familiarisation with the data. Themes were then identified based on recurring patterns and common trends aligned with the research questions. These themes were subsequently organised and reported in the findings section, supported by direct quotations from students.

3. Results

3.1. Analysis of Quantitative Data

Prior to conducting further statistical analyses, the normality of the quantitative data distribution was examined. Given that the sample size exceeded 50, the Kolmogorov-Smirnov test was initially considered for assessing normality. However, it is known that normality tests are highly sensitive in large samples ($n > 300$) and show even small deviations as significant (Tabachnick & Fidell, 2013). Therefore, skewness and kurtosis values were used as the primary criteria for evaluating the distribution of the data. The normality test results are presented in Table 2.

Table 2. Normality Test Results for the Total Scale Score and Sub-Dimensions

Variable	Skewness	Kurtosis	Kolmogorov-Smirnov (p)
Overall Scale	-0.874	0.101	.000
Sub-dimension 1: Social Safety and Help-Seeking in Digital Environments	-0.826	-0.254	.000
Sub-dimension 2: Digital Security and Data Protection	-1.133	1.078	.000
Sub-dimension 3: Responsible Technology Use	-0.912	0.291	.000
Sub-dimension 4: Awareness of Cyberbullying and Ethical Behavior	-1.316	1.035	.000

The analysis results indicated that, the total scale score, as well as the skewness and kurtosis values of all sub-dimensions fell within the acceptable range of -1.50 to +1.50. This finding suggests that the data approximated to a normal distribution and that the use of parametric tests is appropriate.

The first research question addressed in the study:

What are the awareness levels of secondary school students regarding safe technology use?

In order to address this question, students' awareness levels regarding safe technology use were examined, and descriptive statistics were calculated from the scale's total score and dimensions. The findings are presented in Table 3.

Table 3. Descriptive Statistics for the Scale and Its Sub-Dimensions

Variable	N	Min	Max	\bar{X}	SD
Overall Scale	668	54	115	97.07	13.13
Sub-dimension 1: Social Safety and Help-Seeking in Digital Environments	668	3	15	11.69	3.12
Sub-dimension 2: Digital Security and Data Protection	668	10	25	21.90	2.87
Sub-dimension 3: Responsible Technology Use	668	6	30	23.37	5.53
Sub-dimension 4: Awareness of Cyberbullying and Ethical Behavior	668	21	45	40.11	5.36

As shown in Table 3, the possible scores on the scale range from 54 to 115. To facilitate interpretation, this range was divided into three equal intervals the range between 54 and 74 indicating low awareness, the range between 75 and 95 as moderate awareness, and the range between 96 and 115 as high awareness. The average score obtained by students on the scale is $\bar{X} = 97.07$. This value falls within the upper interval, indicating that students have a high level of awareness regarding safe technology use.

Scores on the Social Security and Support Seeking in Digital Environments dimension range from 3 to 15. The mean score of students in this dimension is $\bar{X} = 11.69$. This value falls within the upper range of the scale, indicating that students demonstrated a high level of awareness regarding social security and support-seeking behaviours in the digital environment.

Scores on the *Digital Security and Data Protection* dimension range from 10 to 25. The mean score obtained by students on this dimension was $\bar{X} = 21.90$, which falls within the upper range of the scale and indicates a high level of awareness of digital security and data protection.

Scores on the *Healthy Technology Use* dimension range from 6 to 30. The mean score for this dimension was $\bar{X} = 23.37$. This value corresponds to the higher end of the scale, suggesting that students demonstrated a high level of awareness regarding healthy technology use.

Scores for the *Cyberbullying Awareness and Ethical Behaviour* dimension range from 21 to 45. Students' mean score on this dimension was $\bar{X} = 40.11$, indicating a high level of awareness related to cyberbullying and ethical behaviour in digital environments.

Overall, these findings demonstrate that students exhibited high levels of awareness across all dimensions of the scale, with particularly strong awareness in areas related to digital security, ethical conduct, and healthy technology use.

The second research question addressed in the study is:

Do students' awareness levels differ according to the gender variable?

The results of the independent samples t-test conducted to determine whether there is a difference based on the gender variable are presented in Table 4.

Table 4. Independent Samples t-Test Results by Gender

Variable	Gender	N	\bar{X}	SD	<i>t</i>	<i>df</i>	<i>p</i>
Overall Scale	Female	386	97.63	13.04	1.28	666	.200
	Male	282	96.31	13.25			
Social Safety and Help-Seeking in Digital Environments	Female	386	12.04	2.99	3.39	666	.001
	Male	282	11.22	3.22			
Digital Security and Data Protection	Female	386	22.02	2.81	1.28	666	.202
	Male	282	21.73	2.95			
Responsible Technology Use	Female	386	23.20	5.58	-0.92	666	.358
	Male	282	23.60	5.45			
Awareness of Cyberbullying and Ethical Behavior	Female	386	40.36	5.23	1.45	666	.148
	Male	282	39.76	5.51			

The findings indicated that students' overall mean scores on the scale did not differ significantly by gender ($t(666)=1.28$; $p > .05$). Similarly, no statistically significant gender differences were observed across the dimensions of *Digital Security and Data Protection*, *Healthy Technology Use*, and *Cyberbullying Awareness and Ethical Behaviour* ($p > .05$).

In contrast, a significant difference was found between genders in the dimension of social safety and seeking support in the digital environment ($t(666)=3.39$; $p < .01$). When examining the average scores, it was observed that female students ($\bar{X} = 12.04$) had a higher level of awareness than male students ($\bar{X} = 11.22$).

These findings suggest that students' overall awareness of safe technology use is largely similar across genders; however, female students appear to be more aware than their male

counterparts with respect to social security and support-seeking behaviours in digital environments.

The third research question addressed in the study is:

Do students' awareness levels differ according to class level?

The results of the one-way analysis of variance (ANOVA) conducted to determine whether there are differences according to class level are presented in Table 5.

Table 5. ANOVA Results by Grade Level

Variable	F	df	p	Significant Difference
Overall Scale	12.01	3–664	.000	5th grade < 6th, 7th, 8th
Social Safety and Help-Seeking in Digital Environments	27.76	3–664	.000	5th grade < 6th, 7th, 8th; 6th < 7th, 8th
Digital Security and Data Protection	0.77	3–664	.514	None
Responsible Technology Use	8.50	3–664	.000	5th grade < 6th, 7th, 8th
Awareness of Cyberbullying and Ethical Behavior	4.85	3–664	.002	5th grade < 7th, 8th

The analysis results indicated that students' overall awareness scores differed significantly according to grade level ($F(3,664)=12.01$; $p < .001$). Post-hoc tests revealed that the awareness levels of 5th grade students were significantly lower than those of 6th, 7th and 8th grades.

When the results were examined at the dimensional level, statistically significant differences were observed in several dimensions. A significant grade-level difference emerged in the *Social Security and Support Seeking in Digital Environments* dimension ($F=27.76$; $p < .001$), with fifth-grade students scoring lower than students in all other grades. In addition, sixth-grade students scored significantly lower than seventh- and eighth-grade students in this dimension.

No statistically significant differences were found across grade levels in the *Digital Security and Data Protection* dimension ($p > .05$).

In contrast, a significant difference was identified in the *Healthy Technology Use* dimension ($F=8.50$; $p < .001$), where fifth-grade students scored significantly lower than students in the sixth, seventh, and eighth grades.

Similarly, significant grade-level differences were observed in the *Cyberbullying Awareness and Ethical Behaviour* dimension ($F=4.85$; $p < .01$). Specifically, fifth-grade students' scores were significantly lower than those of seventh- and eighth-grade students.

These findings reveal that students' awareness of safe technology use generally increases as grade level increases, with upper-grade students being more conscious, particularly regarding social security, healthy technology use, and cyberbullying.

3.2. Analysis of Qualitative Data

The fourth research question addressed students' experiences regarding the risks they encounter in digital environments, their strategies for safe technology use, and their views on online behaviour. Data obtained from semi-structured interviews were analysed using a thematic

analysis approach, through which eight main themes were identified. The identified themes and illustrative student perspectives are presented in Table 6.

Table 6. Themes and Sample Quotes from Students' Views

Theme	Sub-Theme	Sample Student Quotes
1. Sources of Support in Distressing Situations	Turning to family	"I share it with my family because they know better than me and can help." (S12) "Sometimes I share it with my mother because she gives me confidence." (S14)
	Turning to friends	"I share it with my desk mate because we think alike." (S8)
	Not sharing with anyone	"With no one, because I've never experienced it." (S6)
2. Consulting Before Sharing Photos/Videos	Consulting family	"I usually ask for approval; I never post without consulting my family." (S18) "Yes, I ask my family." (S17)
	Not consulting	"No, I don't ask." (S15)
3. Distinguishing Safe/Unsafe Websites	Preferring trusted platforms	"I usually enter sites that I know are safe." (S16)
	Difficulty in distinguishing	"I can't distinguish them." (S15, S9)
	Attention to technical cues	"When I see the option to accept cookies, I exit." (S13)
4. Suspicious Links and Free Offers	Avoidance	"I definitely don't click; I think it's fraud." (S18) "They are never convincing." (S9)
	Finding attractive	"Free games are a nice thing, I think." (S14)
5. Daily Screen Time Control	Self-monitoring	"I try to track my usage by checking my phone." (S18)
	With family support	"I ask my mother to keep track of the time." (S12)
	Setting a time limit	"I set an hour and play only until then." (S15)
6. Distractions While Studying	Taking precautions (mute, remove, turn off)	"I mute my phone and only use it for research homework." (S18) "Yes, it distracts me; in that case, I turn off what distracts me." (S12)
	Reporting no effect	"No, it doesn't distract me." (S6)
7. Experiences of Cyberbullying	Those who experienced	"Yes, I experienced it; they shared my photo without permission, and I told my family." (S16, S18) "I experienced it; I didn't care much and blocked the person." (S8)
	Those who did not experience	"No, I've never experienced it." (S11, S12, S13, S15)
8. Respectful Communication Online	Trust and friendship	"Because if we are respectful, we can gain friends." (S18)
	Social order	"Respectful communication online is important for society." (S11)
	Not hurting/maintaining trust	"It is important so as not to hurt the person's trust." (S8)

1. Resources to Turn to in Case of Distress: The vast majority of students reported that they primarily shared the negative experiences they had in digital environments with their families. This shows that the family is perceived as a reliable and trusted source of support. Some students

stated that they preferred to share such experiences with their friends, while a small number indicated that they had not sought support from anyone because they had not had such experiences.

This qualitative finding is consistent with the quantitative results showing that students demonstrate high awareness in the dimension of "seeking social security and support in digital environments."

2. Consultation Before Sharing Photos/Videos: Most students emphasised that they obtained approval from their families before sharing photos or videos. This approach demonstrates that family guidance plays an important role in digital behaviour. However, a small number of students stated that they did not need any consultation. This situation is consistent with quantitative findings showing that students are cautious about online sharing.

3. Distinguishing Between Safe and Unsafe Websites: While some students stated that they only visited sites they considered safe, some students indicated that they had difficulty distinguishing between safe and unsafe sites. Some students also paid attention to technical elements such as cookie permissions.

This finding is supported by high awareness scores in the "Digital security and data protection" dimension in the quantitative data.

4. Suspicious Links and Free Offers: The majority of participants reported that they were cautious about links containing free offers and generally perceived such content as potential scams. However, a small number of students indicated that they found these offers appealing. This qualitative finding aligns with the quantitative results, which showed that students demonstrated a high level of awareness in the *Digital Security and Data Protection* dimension.

5. Daily Screen Time Control: Students described a range of strategies for managing daily screen time. Some reported monitoring their screen use independently, whereas others indicated that they regulated their screen time with the support of their families. Additionally, several students stated that they used technology by setting specific time limits. This finding is consistent with the high level of awareness observed in the quantitative data for the *Healthy Technology Use* dimension.

6. Distractions While Studying: A substantial proportion of students reported that mobile phones and internet use distracted them while studying and indicated that they adopted strategies such as silencing notifications or turning off their devices to manage these distractions. However, some students stated that they did not experience such difficulties during study time. The high awareness scores observed in the quantitative data for the *Healthy Technology Use* dimension further support the presence of these self-regulation strategies among students.

7. Cyberbullying Experiences: Some students reported having previously experienced cyberbullying and indicated that they responded by informing their families or blocking the perpetrator. In contrast, many students stated that they had not encountered cyberbullying. This qualitative finding is consistent with the quantitative results, which demonstrated high levels of awareness in the *Cyberbullying Awareness and Ethical Behaviour* dimension.

8. *Respectful Communication on the Internet*: Students emphasised the importance of respectful communication in online environments, particularly in relation to maintaining friendships, trust, and social order. These views reflect students' developing sense of ethical awareness and social responsibility. The high scores observed in the same dimension within the quantitative findings further reinforce the importance students attribute to ethical behaviour in digital contexts.

4. Conclusion and Discussion

This study examined secondary school students' awareness of safe technology use, with findings supported by both quantitative and qualitative evidence. Overall, the results indicated that students demonstrated a high level of awareness in relation to safe technology use.

Quantitative findings indicated that the mean total score obtained from the scale reflects a high level of awareness of safe technology use among students. These results were further supported by qualitative findings, which revealed that students commonly sought support from their families when encountering disturbing online situations, exercised caution toward suspicious links, regulated their screen time through self-monitoring strategies, and emphasised the importance of respectful communication in online environments. This pattern is consistent with previous research demonstrating high levels of internet safety awareness among secondary school students (Beder & Ergün, 2022). However, studies focusing on information security awareness also highlight that, despite generally high awareness levels in this age group, certain domains require further reinforcement and targeted educational support (Derin & Gençoğlu, 2020). Findings related to dimensions also support this overall trend. With regard to digital security and data protection, students were found to avoid suspicious links and approach free offers with caution. However, the literature indicates that secondary school students may demonstrate relatively lower awareness of software-related threats and copyright violations (Beder & Ergün, 2022; Gagliardi & O'Brien, 2025). In the healthy technology use dimension, students' practices of limiting screen time and disabling digital distractions indicate that their self-regulation skills are developing. This finding is consistent with studies emphasising that parental supervision plays a reinforcing role in promoting safe technology-related behaviours (Gökçeaslan & Seferoğlu, 2016). In terms of cyberbullying awareness and ethical behaviour, students' use of blocking and reporting strategies reflects an emerging capacity for adaptive coping and responsible online conduct. This observation aligns with prior research highlighting the importance of ethical communication and help-seeking behaviours (Gökçeaslan & Seferoğlu, 2016).

In gender-based analyses, no significant difference was observed in the overall scale scores, a statistically significant difference in favour of female students emerged in the dimension of "seeking social security and support in the digital environment". Although the qualitative findings did not yield themes explicitly related to gender, students were found to demonstrate a strong tendency to consult their families. Previous research suggests that female students may exhibit higher levels of awareness in safe internet use (Beder & Ergün, 2022; Derin & Gençoğlu, 2020). Nevertheless, some studies on information security indicate that gender differences emerge on a broader scale (Derin & Gençoğlu, 2020). The limited gender difference observed

in the present study may be attributed to the structure of the measurement tool and gender differences in the perception of social support.

Analyses conducted by grade level revealed that, Year 5 students' awareness scores were significantly lower than those of upper classes. This pattern may be explained by the development of skills in recognising and coping with digital risks as students' progress in age and educational level. Qualitative findings also showed that students in upper grades demonstrated stronger self-regulation strategies (silencing or turning off the phone), critical evaluation (avoiding suspicious links), and help-seeking behaviours. Beder and Ergün (2022) noted that 8th grade students' awareness may be lower in some sub-dimensions; suggesting an increased tendency toward risk-taking associated with greater self-confidence based on self-confidence as they get older. In contrast, the present study found the level of awareness increased from Year 5 to Year 8. This divergence may be attributed to the scale used, the sample context, and methodological differences.

One prominent theme emerging from the qualitative findings was the role of family support. Students consistently identified turning to their families as the most reliable course of action when they felt uncomfortable. This finding aligns with studies indicating that parental mediation is decisive in safe technology use (Gökçeaslan & Seferoğlu, 2016). In addition, the observation that some students consider browser warnings and cookie policies when distinguishing between safe and unsafe sites indicates that elements of technical awareness is also beginning to develop. However, the presence of students who were attracted by free online offers points to a continued need for more education on digital persuasion and commercial risks. The literature also emphasises that students may exhibit lower awareness in the areas of copyright, sharing, and software threats (Beder & Ergün, 2022; Gökçeaslan & Seferoğlu, 2016).

In conclusion, the findings indicate that secondary school students demonstrate generally high levels of awareness regarding safe technology use; however, age, experience, and individual differences play a decisive role in shaping how this awareness is translated into actual digital behaviours. These results highlight the importance of designing age-appropriate and developmentally sensitive educational interventions that account for students' varying levels of digital experience and self-regulation skills.

5. Recommendations

Educational programmes: Basic digital security and risk awareness training should be provided more intensively, especially for younger age groups (Year 5).

Parent-teacher collaboration: Considering that parents are the primary source of trust for students, school-parent collaboration should be increased and guidance programmes should be strengthened.

Practical training: It is recommended that students be taught about risky situations such as suspicious links, copyrights, and digital persuasion methods through scenarios and case studies.

Policy development: Age-appropriate applications should be integrated into the Ministry of National Education's policies on digital citizenship, combating cyberbullying, and internet safety.

6. Limitations

Although this study provides valuable insights into secondary school students' awareness of safe technology use, it has several limitations that should be considered:

Sample limitations: The participants were drawn from a single academic year (2025–2026) and a limited number of schools. Therefore, the findings may not fully represent all secondary school students in different regions or socio-economic contexts.

Self-report data: The quantitative data were obtained through self-report scales, which may be influenced by students' tendency to give socially desirable answers rather than their actual behaviour.

Interview depth and scope: The qualitative part was limited to semi-structured interviews with 18 students. Although it enriched the findings, the small sample size limits the generalisability of the qualitative results.

Cross-sectional design: The study used a cross-sectional approach, providing only a snapshot of awareness levels. Longitudinal studies could better reveal how awareness develops over time.

Contextual factors not examined: Variables such as parental education level, internet access at home, and digital literacy of teachers were not analysed. These factors could significantly influence students' awareness levels.

Ethics Committee Approval Information

Ethics committee permission for this study was obtained from the İstanbul University-Cerrahpaşa Social and Human Sciences Research and Publication Ethics Committee with the decision dated on 09.09.2025, and numbered 2025/519.

Declaration of Conflicting Interests

The authors declare no conflict of interest.

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