Assessment of Parents' Awareness in the Field of Cybersecurity

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Abstract: This article presents the results from an anonymous survey conducted in 2024 with parents of students from 1st to 12th grade in secondary school. The study includes a self-assessment of knowledge and skills regarding cybersecurity, including devices used, options for preventing cyberattacks, protection measures, authentication, and related topics. A comparative analysis of the parents' survey results with those of a similar survey conducted among their children's teachers was conducted.

Keywords: Cybersecurity, Cyberbullying, Digital competence, Self-assessment, Parents

1. Introduction

With the educational transformation in the country, as a result of COVID-19, parents of Bulgarian students continue to play a key role in the smooth running of electronic activities related to school. The Ministry of Education and Science of the Republic of Bulgaria continues to work on the introduction and maintenance of centralized solutions to support the learning process in the school and preschool education system, such as the web platform for assessments NEISPUO [1].

Over the past decade, various projects have been implemented, including through consortia from different countries, aimed at supporting parents in the process of educating children about digital culture and awareness regarding

cybercrime and cyberbullying, [2], [3], [4]. Other projects are aimed at ways to measure and assess the digital culture of stakeholders [5].

However, the pace of development of digitalization worldwide requires constant updating of national and international strategies and policies regarding cybersecurity, as well as ensuring awareness and trust of citizens in their introduction and implementation [6], [7], [8], [9], [10], [11].

2. Problem description

According to UNICEF Bulgaria, over 46 thousand reports were submitted and processed to the National Safer Internet Center in 2023. A year later, the number of reports increased fivefold – over 293 thousand, with over 95% of them related to abuse of children aged 10 to 14 [12]. According to the latest report by the European Commission, regarding cyberbullying: „Shorter interventions tend to be more successful, especially when combined with active parental involvement. Active participation and inclusion of parents in interventions is suggested to potentially enhance outcomes" [13].

Considering the above, we believe it is appropriate to organize regular surveys among parents of students in the country regarding the current state of their preparedness for support in the field of cybersecurity and cyberbullying. Such analyses would help create and update future trainings with stakeholders, taking into account the current need for targeted awareness on a pressing issue.

3. Methodology of conducted survey

Here we will present results from an anonymous survey conducted with parents of students from 1st to 12th grade, including self-assessment of knowledge and skills regarding cybersecurity - devices used, options for preventing cyberattacks, means of protection, authentication, etc. A total of 138 parents from the "Hristo Botev" Secondary School in Septemvri city, Bulgaria participated in the survey. The survey was conducted in the period from 29.04. to 27.05.2024 via Google Forms. A comparative analysis of the results of the parents' survey was conducted with the results of a similar survey conducted with their children's teachers [14].

4. Analysis of the results

The study included 138 parents of students from 1st to 12th grade from the "Hristo Botev" Secondary School in Septemvri city. 46% of the respondents were between 31 and 40 years old. The next largest group is parents between 41 and 50 years old – 38%. There are no representatives over 60 years old. 94% indicated female gender, and 6% male (Fig. 1).
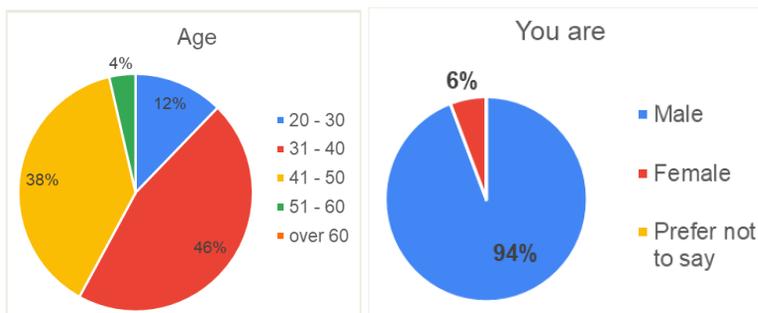
Fig. 1. Age (left) and gender (right) distribution of parents

55.1% of the parents have secondary education. Higher education have 44.9% of the parents, of which 26.1% have also completed a master's degree (Fig. 2).
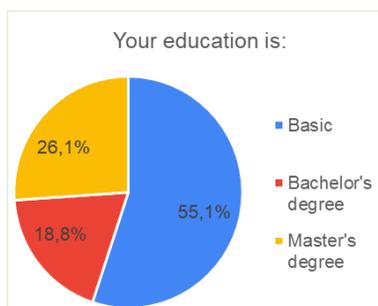

Fig. 2. Last completed education by parents

Over half of the respondents are parents of students from 1st to 4th grades – 52.1%. The same percentage are parents of students from 5th to 7th grades, and from grades 8th to 12th – 31.9%. In total, 15.9% of the parents have students in 2 different grades, which has increased the percentage ratio in the data for some of them (Fig. 3).
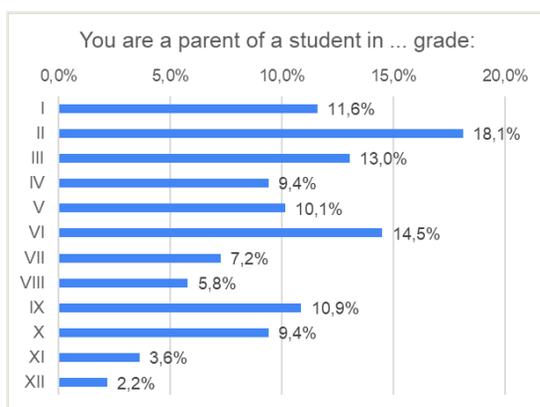

Fig. 3. You are a parent of a student in .... grade

All respondents use one of the following devices to access the Internet. The largest percentage use a mobile phone (96%) and a laptop (72%). The same two devices are also most used by their children's teachers [14].

Up to two devices are used by 41% of parents to access the Internet. Of those accessing the Internet through one device, two noted that they do so through a laptop, and the rest through a mobile phone. 24% of respondents use three devices, and 17% use four. There are no parents who use all devices (Fig. 4). Like in the study with their children's teachers, her alsko there are also no parents who use the full number of devices described [14].
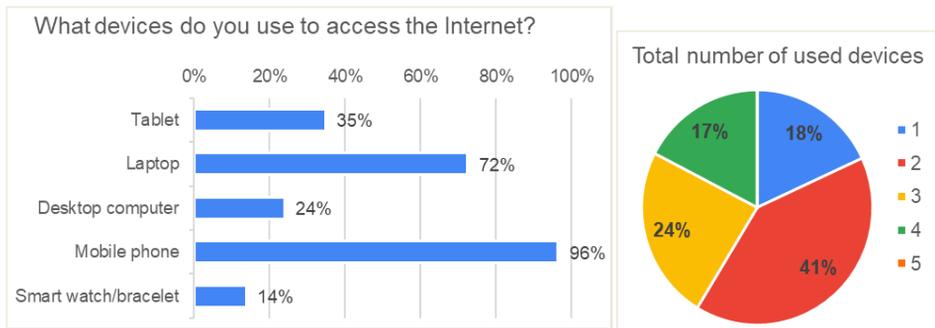

Fig. 4. Types (left) and number (right) of devices used by parents to access the Internet

There is a diversity in the time spent by parents on the Internet. Over 25% of parents use "1 to 2 hours" per day on both Mobile Internet and Wi-Fi. In total, 9% of respondents use "over 8 hours" on both types of Internet. Every parent uses at least one type of Internet, but up to 5% noted that they do not work with a specific type (Fig. 5).
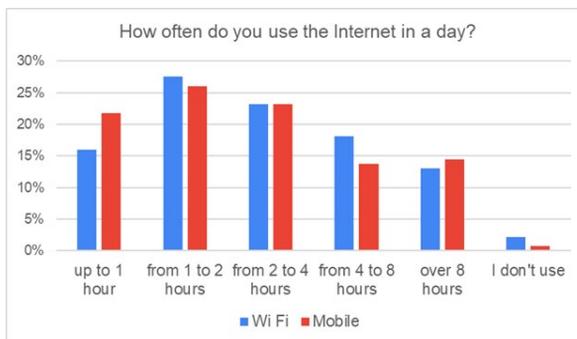

Fig. 5. Amount of time spent using the Internet per day

From 50% to 75% of surveyed parents are aware of the listed threats related to information security. However, any of the threats is somewhat unknown to all those who participated in the survey. As with their children's teachers [14], and

for parents, the most well-known threat is "Viruses, worms and Trojan horses" with a mention of 75% (Fig. 6).
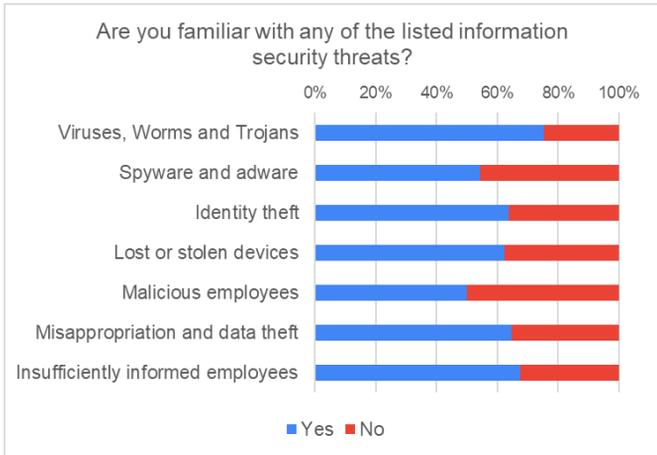

Fig. 6. Knowledge of information security threats

"Antivirus program" is used by 85% of parents, and all of their children's teachers are familiar with it [14]. The remaining five means of protection are used by between 20% and 29% of respondents. Up to 20% of all listed means of protection are unknown to parents (Fig. 7).
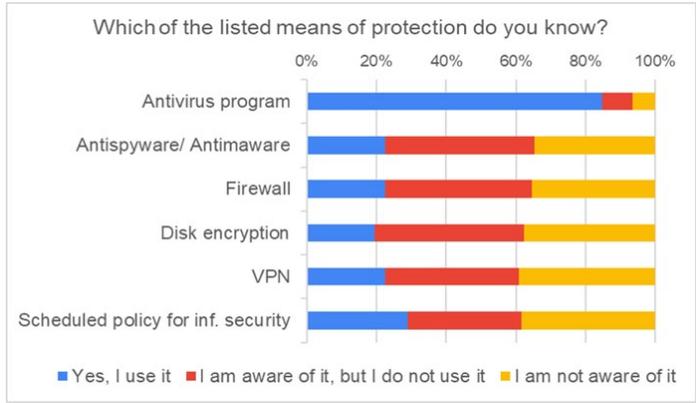

Fig. 7. Level of awareness of protection tools

Parents are not aware, to varying degrees, of all the multi-factor authentication options presented in Fig. Yet, each authentication option is used to some extent. The most commonly used are "fingerprint" (48%), "facial recognition" (46%), and SMS (43%). The least familiar to parents are "Authy" (43%) and "Vein Recognition" (55%), which are also the least preferred by their children's teachers [14].
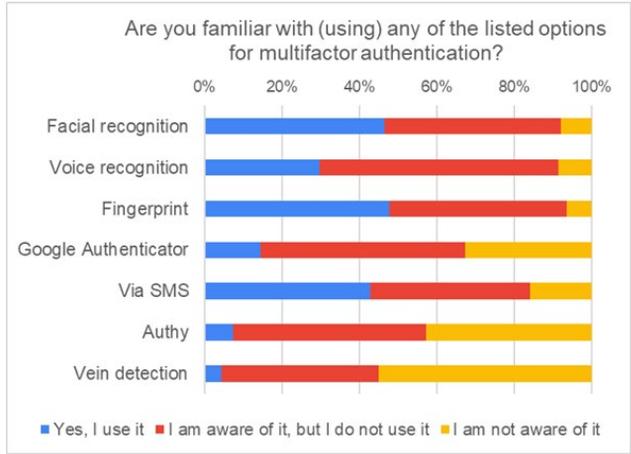
Fig. 8. Level of knowledge of multi-factor authentication options

23% of the parents believe they have been a victim of a cyberincident/cybercrime, with one specifying "They stole my email account". 4% answered "I don't know", 1% think it is "Possible", but cannot judge (Fig. 9).
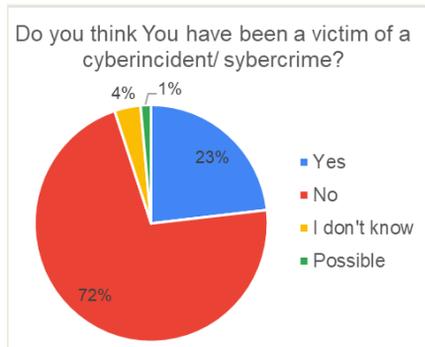

Fig. 9. Self-assessment of having experienced a cyberincident or cybercrime

All parents have undergone at least one of the training courses listed in Fig. 10 in the last five years. The most respondents participated in training courses on the topics of "digital communication technologies" (49%) and "digital resources" (41%). 22% of parents have undergone training on "cybersecurity", while 50% of their children's teachers have undergone a similar course [14]. From the parents, 9% each participated in training on the topics of "artificial intelligence" and "robotics", while none of their children's teachers had attended such training [14].

83% of parents have attended up to one training course in the last five years, with 13% of them choosing the topic "cybersecurity". Another 13% have participated in up to two training courses in the same period. Three or four training

courses were attended by 1% of the remaining respondents. In total, five parents noted that they had attended training courses on all five specified topics (Fig. 10).
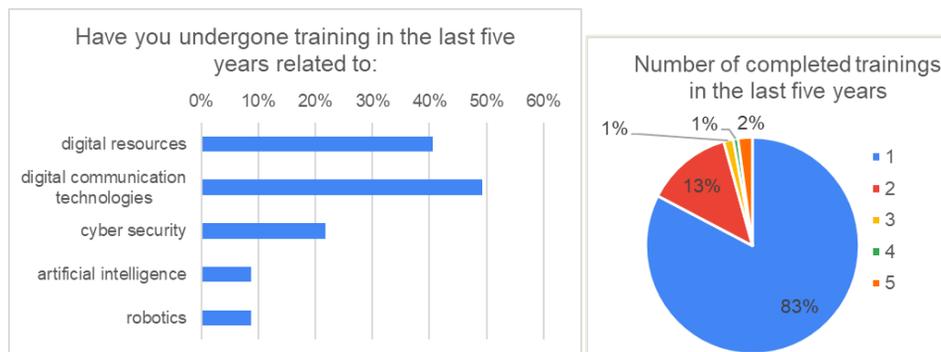

Fig. 10. Types (left) and number (right) of training completed by parents in the last five years

Half of the students have shared concerns about their online browsing with their parents (Fig. 11). According to data from a similar survey with the teachers of the same children, 33.3% have shared about cyberbullying [14]. That is, children turned to a parent more often with a question about safe internet surfing than to a teacher. 60.1% of the parents believe they are competent to respond to their children in the event of a case regarding safe online browsing

Fig. 11. Rate of sharing by students about cyberbullying and parents' Self-assessment of readiness to support them

At the same time, only 29% of parents believe that they are more competent than their children in terms of safety on the Internet. Accordingly, 35.5% of parents feel less competent than their children. Another 35.5% cannot judge who is more prepared (Fig. 12). Compared to a similar study, 66.7% of their children's teachers also do not believe that they are more competent than these students [14].
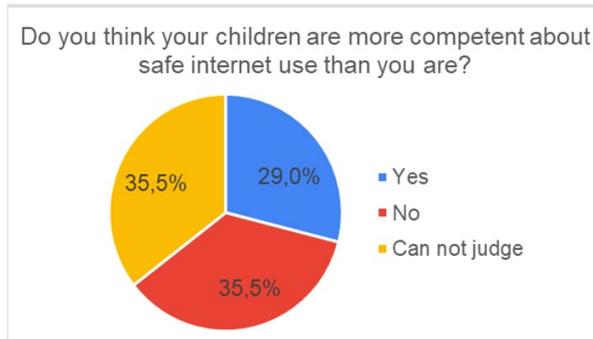
Fig. 12. Parents' assessment of children's Internet competence

43.5% of parents believe that there is a difference in their children's behavior in cyberspace compared to the real environment (Fig. 13). One third of their children's teachers surveyed have the same observation [14].
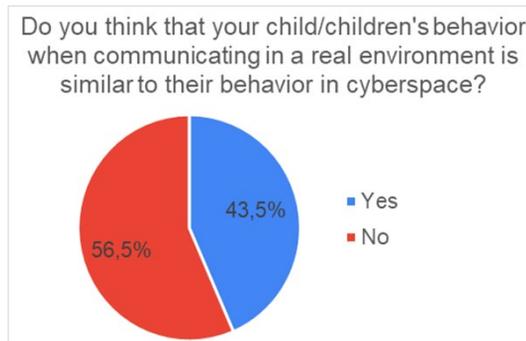

Fig. 13. Assessment of the relationship between children's behavior in real environments and in cyberspace

Parents' self-assessments of digital competence are high (Fig. 14). The average scores - 3 (43%) and 4 (28%) are the most. The highest self-assessment (5) was indicated by 15% of parents. In comparison with the similar study, 66.7% of their children's teachers indicated the maximum – 5 [14].
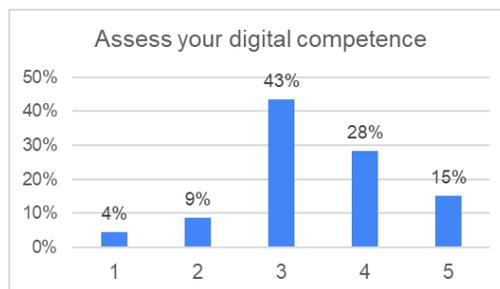

Fig. 14. Self-assessment of digital competence

One of the parents shared in free text that: "We parents also need information"; gave a self-assessment of 3 on the digital competence question; spends little time online – from 1 to 2 hours via Wi-Fi, and up to 1 hour via mobile Internet; partially knows the threats, means of protection and methods for multi-factor authentication included in the survey; his child has approached with concerns regarding safety when surfing the Internet; as a parent does not feel competent to help his child regarding cybersecurity and cyberbullying in the online space.

5. Conclusion

The results of an anonymous survey conducted with parents of students from grades 1 to 12 in secondary school reported an insufficient level of knowledge of basic options for preventing cyberattacks, means of protection, authentication, etc. A comparative analysis of the results of surveys of parents and teachers of the same children reported that children more often turned to a parent with a question about safe surfing on the Internet than to a teacher. Parents feel less competent than their children in this regard. They believe that they need support to be useful in the event of a cyberincident/ cyberbullying. Both parents and teachers believe that there is a significant difference in the behaviour of their children in cyberspace compared to the real environment.

Parents have participated in fewer training courses in the last 5 years compared to teachers. Their topics were mainly focused on "digital communication technologies" and "digital resources" - probably in connection with the digital diaries introduced in the country at school and the need for distance learning.

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Appendix 1: Survey

(1) You are:
Male; Female; I prefer not to specify

(2) Age:
20–30; 31–40; 51–60; over 60

(3) Your education is:
Basic; Bachelor's degree; Master's degree

(4) You are a parent of students in .... grade:
I; II; III; IV; V; VI; VII; VIII; IX; X; XI; XII

(5) What devices do you use to access the Internet?:
Tablet; Laptop; Desktop computer; Mobile phone; Smart watch/bracelet; Other

(6) How often do you use Wi-Fi and Mobile Internet in a day?:
up to 1 hour; from 1 to 2 hours; from 2 to 4 hours; from 4 to 8 hours; over 8 hours; I don't use

(7) Do you know any of the listed information security threats (Yes/No)?:
Viruses, worms and Trojans; Spyware and adware; Identity Theft; Lost or stolen devices; Malicious employees; Misappropriation and data theft; Insufficiently informed employees

(8) Which of the listed means of protection do you know (Yes, I use it; I am aware of it, but I do Not use it; I am Not aware of it)?:
Antivirus program; Antispyware/ Antimalware; Firewall; Disk encryption; VPN; Scheduled policy for inf. Security

(9) Are you familiar with (using) any of the listed options for multifactor authentication know (Yes, I use it; I am aware of it, but I do Not use it; I am Not aware of it)?: Facial recognition; Voice recognition; Fingerprint; Google Authenticator; Via SMS; Authy; Vein detection

(10) Do you think you have been a victim of a cyberincident/ cybercrime? – free answer

(11) Have you undergone training in the last five years related to:
digital resources; digital communication technologies; cyber security; artificial intelligence; robotics

(12) Have your children shared with you their concerns when surfing online?
Yes/No

(13) If your children have approached you with questions about safe surfing, do you feel you are competent enough to help them?
Yes/ No

(14) Do you think your children are more competent about safe internet use than you are?
Yes; No; Can not judge

(15) Do you think that your child/children's behavior when communicating in a real environment is similar to their behavior in cyberspace?:
Yes/ No

(16) Rate your digital competence:
from 1 (low) to 5 (high)