

Digital safety and its importance in teacher education. Analysis of children's online behaviour in the Czech and Polish context

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ABSTRACT

Internet use has skyrocketed in recent years, leading to risky behaviour such as online aggression. The aim of this study was to analyse the risks in the online environment of Czech and Polish students, with a special focus on online aggression. A quantitative approach was employed using an online survey. A total of 13657 students from the Czech Republic and Poland, aged 7-17 years ($M = 13.75$; $SD = 3.85$), participated in the study. The results revealed the apps most used by children (mostly YouTube, Facebook and Instagram) and online safety issues such as user theft, sexting and cyber-aggression. Finally, the implications of this work are discussed, highlighting the richness of the data obtained in relation to risk behaviours on the Internet during the Covid-19 pandemic.

KEYWORDS: Digital Security; cyberbullying;; sexting; Czech Republic; Poland; children.

La Seguridad Digital y su Importancia en la Formación del Profesorado. Análisis del Comportamiento Online de estudiantes en el contexto checo y polaco

RESUMEN

El uso de Internet se ha disparado en los últimos años, lo que ha dado lugar a comportamientos de riesgo como las agresiones en línea. El objetivo de este estudio era analizar los riesgos en el entorno online de los estudiantes checos y polacos, con especial atención a la agresión online. Se empleó un enfoque cuantitativo mediante una encuesta en línea. Participaron en el estudio un total de 13657 estudiantes de la República Checa y Polonia, con edades comprendidas entre los 7 y los 17 años ($M = 13,75$; $SD = 3,85$). Los resultados revelaron las aplicaciones más utilizadas por los niños (principalmente YouTube, Facebook e Instagram) y los problemas de seguridad en línea, como el robo de usuarios, el sexting y las ciberagresiones. Por último, se discuten las implicaciones de este trabajo, destacando la riqueza de los datos obtenidos en relación con los comportamientos de riesgo en Internet durante la pandemia de Covid-19.

PALABRAS CLAVE: Seguridad digital; Ciberacoso; Sexting; República Checa; Polonia.

Introduction

The Internet is an environment that offers its users a plethora of possibilities - it is a source of entertainment and education, it allows you to communicate effectively, meet others, build your virtual identity and self-fulfilment. However, we must not forget the negatives that the virtual environment brings with it - in the Internet environment we can encounter a large amount of aggressive behaviour, various types of fraud, risky phenomena associated with online dating (cybergrooming), cyberbullying, but also, for example, misinformation and hoaxes, which affect the behaviour of users and have an impact on the real world.

The Internet can be particularly dangerous for children, who, although they have technical knowledge and skills, often lack experience and are not always able to assess risk and behave responsibly and safely.

Hundreds of studies have been carried out in recent years and are still under way on the behaviour of children in the online environment, its positives, and its negatives. Some of the most frequent research includes studies on cyber aggression and cyberbullying. However, when we systematically analyse the results of research, we encounter a fundamental problem, which lies in the inconsistent definition of cyberbullying and the use of incompatible research tools - cyberbullying is very often referred to as one-off incidents that are not repeated and have little impact on the victims. The most well-known tools used to measure the prevalence of cyberbullying include: BPS - bullying perpetration scale (Espelage et al., 2003), CQ - cyberbullying

questionnaire (Smith et al., 2006), CBI - cyberbullying inventory (Erdur-Baker & Kavut, 2007), OBVQ = Olweus Bully/Victim Questionnaire (Olweus, 1996), SSBB-R2 - Survey of Bullying Behavior-Revised 2 (Varjas, et al., 2006), YISS - Youth Internet Safety Survey (Finkelhor et al, 2000), YISS-2 - Second Youth Internet Safety Survey (Ybarra et al., 2006), and many others.

In 2012, research on children's addictive behaviour was conducted in Europe, which also focused on cyberbullying (Tsitsika et al., 2012). Experience with cyberbullying was confirmed by 21.9% of respondents out of more than 13,000 children from 7 European countries - Germany, the Netherlands, Poland, Romania, Spain, Greece and Iceland.

Other researchers (Čechová & Hlistová, 2009; Kováčová, 2012), also point to an increase in the number of cyberbullying victims in Slovakia (up to 38.7% of children). An overview comparison of cyberbullying research in Europe is offered by Hollá (2013), who compares research on cyberbullying conducted in Germany, Spain, the UK, Ireland and the Slovak Republic. For example, research conducted in Spain (Ortega et al., 2008), on a sample of 1,661 respondents aged 12-17 years yielded the following results: 4.2% of respondents were victims of cyberbullying via mobile phones, 7.5% via the Internet.

Hollá's study (2015) from the Slovak Republic points out that cyberbullying of boys occurs most often at the age of 17, and boys are also statistically more likely to be cyberaggressors. The most common forms of attacks used by boys were sending abusive messages (28.9%), sending false information (24.3%) and sharing compromising photos online (19.6%).

One of the first studies of cyberbullying in the Czech Republic was conducted by AISIS in cooperation with the O2 Foundation in 2009 (Udatná, 2010). According to its results, 10% of Czech children have experienced cyberbullying. This research provides very important information about who the perpetrators of cyberbullying are - 51% of aggressors were from the same class as their victim, and 78% of aggressors were from the same school. This means that although the aggressor is anonymous, he can be successfully found in the victim's neighbourhood - among classmates. These findings are confirmed by other research and studies.

Very important information on cyberbullying and other risky forms of online communication is provided by the EU Kids Online survey (Livingstone et al., 2014), which was conducted in 2010 in 25 European countries. According to its findings, approximately 5% of European children aged 11-13 and 8% of European children aged 14-16 experience cyberbullying. EU Kids Online represents the most extensive research on cyberbullying in Europe, with the biggest advantage of using the same methodology across multiple countries. This allows data on the prevalence of cyberbullying to be compared between EU countries.

Kopecký et al. (2014a, 2014b) from the Czech Republic point to an increase in serious cases of cyberbullying in the form of blackmail and threats to a child, whereby intimate materials lured from the child are used to attack. They also point to the link

between cyberbullying and sexting, which facilitates the implementation of intense attacks on children.

A study of Czech children in the cyberworld (Kopecký & Szotkowski, 2019), conducted in the Czech Republic on a sample of over 27000 children points out that approximately 41% of Czech children experience online aggression within 1 year. However, this is not cyberbullying, its prevalence is lower and it is experienced by no more than 10 per cent of Czech children. This study also maps which social networks (and social services) Czech children use in the online environment and highlights, for example, the increase in the number of children using the social network TikTok (about 28.48% of Czech children used this social network in 2018-2019).

The Czech-Polish environment is the subject of a comparative study (Tomczyk & Kopecký, 2015), which highlights the following issues that are common to the Czech and Polish environments:

- a) Children share a large amount of potentially abusive personal data.
- b) Children use online services that are not intended for them (e.g. with regard to age and content).
- c) Children meet other internet users online - without verified identity.
- d) Only some children seek help from an adult when they experience a risky situation online.

Other topics that directly affect children in the online environment include the consensual (or nonconsensual) sharing of their own intimate material with other users of the network - so-called sexting. Research on sexting has been conducted since 2008 in a number of countries - the USA, UK, Belgium, Germany, Australia, Canada, China (Jolicoeur & Zedlewski, 2010; Klettke et al., 2014), as well as in the Czech and Slovak Republics (Holla et al, 2018; Kopecký et al., 2014a)

The EU Kids Online research also conducted in Slovakia (Tomková, 2010) puts the sexting rate in the Slovak teenage population in the range of 4.6-9.6% (4.6% of respondents confirm that they have published photos of themselves in their underwear or fully nude). We compare the results of this finding with the results of our research (below).

Interesting results are also provided by an Italian study carried out by researchers from Sapienza University of Rome (Morelli et al., 2016), involving 610 individuals aged 13-20 (females constituted 63.1% of the sample) recruited from Italian public schools and universities. According to its results, 77.2% of the participants confirmed receiving sexually explicit material, 54.8% had sent sexually explicit material to another person at least once, and 8.5% confirmed that they had disseminated the material through social networks.

Research conducted in recent years in the US (Ybarra & Mitchell, 2014), also shows that approximately 7% of young Americans aged 13 to 18 years send their own intimate material to their peers. The authors also point out that sexting is a feature of sexual development and discovery, so it is not a problem primarily caused by modern technology.

Other research, conducted in the US with a sample of over 3000 adults aged 18-24 then confirms that 28% of them engage in sexting (send and receive intimate materials), 12% then only receive intimate materials (do not send to others) (Levine, 2013).

A very good overview of the prevalence of sexting is provided by a systematic review of information on sexting conducted by researchers at Deakin University (Klettke et al., 2014), which clearly presents the results of studies on sexting in recent years in Europe and the USA. Its results are then complemented by a systematic review conducted by English and Swedish researchers (Cooper et al., 2016).

Hinduja and Patchin (2018), also conducted research on sexting among American students aged 12-17 in 2016, and the prevalence of sexting was monitored in relation to age. The following chart then summarizes the resulting findings by age category. The results show that the number of intimate content senders increases as the age of the sender increases, with more than 18% of children in the 17-year-old category sending such material.

A more recent systematic review conducted by researchers from Canada, the USA, and Belgium (Madigan et al., 2018) includes an analysis of 39 sub-studies with a total of 110,380 respondents. The data processed by the researchers came from the MEDLINE, PsycINFO, EMBASE and Web of Science databases (1990-2016); data extraction and synthesis met the requirements set by the PRISMA methodology, and meta-analysis was used to process the data. The studies map the sending, receiving, forwarding of materials to others.

According to the results of the above systematic study, the prevalence of sexting has been steadily increasing and increases with age. Similarly, the meta-analysis revealed that the prevalence of sexually oriented messages received is higher than the prevalence of messages sent. Since essentially identical instruments are used for measurement, this difference is not due to the method used and the methodology itself but has other causes. According to some researchers (Klettke et al., 2014), some respondents do not want to disclose that they are actively involved in the dissemination, some respondents then send the same material to multiple people at the same time, those who receive the material then do not send their own, etc. The increase in the prevalence of sexting as a child's age increases corresponds to the age at which young people discover their sexual identity and sexuality - according to some authors, sexting can then be considered a normal part of sexual behaviour and development (Temple & Choi, 2014). Similarly, it can be said that sexting is hardly realised by children under the age of 12, with only one study (Mitchell et al., 2012) included in the meta-analysis revealing the presence of sexting in children aged 10-11 years, which found that only 1 per cent of that age group realised sexting. Given that this study was conducted several years ago, this data can be considered outdated - if only because at the time of the research (2010-2011) smartphones were not as prevalent among this age group as they are today, and their peer relationships tend to be transient. However, children of this age group are at risk of phenomena that

purposefully exploit children's intimacy, e.g., in the context of so-called sextortion (blackmail that uses children's intimate materials - photos, videos) (Açar, 2016; Canadian Centre for Child Protection, n.d.; Kopecký, 2017).

New research on sexting in the Czech Republic (Szotkowski et al., 2020), focuses on the three-dimensional concept of sexting and reveals that sexting in the form of sending intimate photos of oneself is practiced by 15.68% of Czech children, with 74% of them sharing intimate photos rarely and 26% often. Approximately 5.9% of Czech children send intimate videos.

Therefore, the purpose of this research was to analyse the risks in the online environment of Czech and Polish students, with a special focus on online aggression. The research questions guiding this study were:

RQ1. Which types of online sites do children visit most often?

RQ2. Which social networks (services) do children actively use?

RQ3. Which types of aggression children encounter in the online environment?

RQ4. How often do children engage in sexting?

Methodology

The research "Risk phenomena in the online environment among children in the Czech-Polish border region" was conducted as part of the Czech-Polish project "Making Czech-Polish cooperation more effective in the fight against cybercrime" implemented within the InterReg V-A Czech Republic-Poland Programme (CZ.11.4.120/0.0/0.0/17_028/0001654) in cooperation with eight regional police directorates (five from the Czech Republic and three from Poland), and the expert team of the Centre for the Prevention of Risky Virtual Communication of the Faculty of Education of Palacký University in Olomouc. In this study, we compare and use the results of two studies conducted within the framework of this project – Risk phenomena in the online environment among children of the Czech-Polish border region (Czech Republic) (Kopecký & Szotkowski, 2020), and Risky behaviour in the online space among children and youth in the Czech-Polish border region (Poland) (Tomczyk et al., 2020).

The research was conducted during 2019-2020 in selected regions of the Czech Republic and Poland, the monitored area was mainly the Czech-Polish border area.

Participants and procedure

A cross-sectional study design was adopted where an anonymous online questionnaire was applied and distributed to the target group of pupils through the schools' own database (using the school register). The questionnaire was localised into Czech and Polish, and pupils completed the questionnaires during lessons. The research was carried out within the monitored area, which is made up of NUTS3 regions and includes five Czech regions and six Polish sub-regions. In the Czech

Republic these are the Liberec, Hradec Kralove, Pardubice, Olomouc and Moravian-Silesian regions, in Poland the subregions of Bielski and Rybnicki (Silesian Voivodeship), Jeleniogórski and Wałbrzyski (Lower Silesian Voivodeship), Nyski and Opolski (Opole Voivodeship).

Finally, the research sample consisted of a total of 13657 students. Specifically, 12408 were students aged 7-17 years from five regions of the Czech Republic (50.35% were boys and 49.65% were girls), the average age of the respondents was 13.15 years. On the other hand, the remaining students were a total of 1249 students aged 10-17 from the border region of Poland (37.38% were boys and 62.62% were girls), the average age of the respondents was 14 years.

Measures

An ad hoc questionnaire consisting of 39 items was applied to analyse risks in the online environment of Czech and Polish students. The mode of response was frequency-based and a dichotomous scale (yes or no) was used. The items were grouped into three broad dimensions: (i) Internet page (13 items; example item: Gaming related websites as on-line games, game manuals etc.); (ii) social networks (15 items; example item: Instagram); (iii) aggression (11 items; example item: Someone harmed me verbally through the Internet or a mobile phone). The questionnaire was subjected to a process of content validation by expert judgement, composed of four doctors specialising in the field of educational technology. The degree of agreement of the experts on the items of the questionnaire was 100%, once the questions suggested by each of them had been corrected. Finally, with respect to internal consistency, Cronbach's Alpha test was applied, which obtained a result of $\alpha = .94$, an optimal value to guarantee the reliability of the instrument.

Data analysis

In the data analysis, values for frequency and percentage of cases were established. Data analysis was performed using Microsoft Excel Professional Plus 2013 (Microsoft, Redmond, WA), and IBM SPSS, version 24 (IBM Corp., Armonk, NY).

Limits

Although the same research instrument was used in the Czech-Polish environment, a smaller number of respondents was obtained on the Polish side compared to the Czech Republic. Therefore, data from the Czech and Polish border regions do not have the same meaningful value.

Results

Children are active consumers of all kinds of content in the online environment - in our research, we therefore focus on websites and online services (especially social networks) that children actively use, on the one hand, and on the other hand, we map in detail the video production that children watch on a regular or less regular basis. We also devote a separate part of the research to the issue of online aggression that children encounter in the online environment.

Czech and Polish children in the online environment

Children in the Czech-Polish border region actively use social networks, video sharing sites (e.g. YouTube), as well as online encyclopaedias and game portals. They also use a wide range of other tools, e.g. online encyclopaedias, gaming sites, file repositories, etc.

About one tenth of respondents in both countries visit sites with pornographic content (11.05% in the Czech Republic and 11.29% in the Poland). Approximately 2-5% of children in both countries also confirm that they visit darknet sites (Table 1).

Table 1

Which types of online sites do children visit most often?

Internet page/service	Absolute frequency	Relative frequency	Absolute frequency	Relative frequency
	(n)	(%)	(n)	(%)
	Czech Republic		Poland	
Social networks	8157	65.58	1018	81.51
Video sharing servers (e.g. YouTube, Vimeo, Stream etc.)	6250	50.25	1057	84.63
On-line encyclopaedias (e.g. Wikipedia)	4498	36.16	870	69.66
Gaming related websites (on-line games, game manuals etc.)	3422	27.51	550	44.04
File storage (e.g. Hellspy, Ulož.to etc.)	3276	26.34	124	9.93
E-shops, second-hands, auction servers	2859	22.99	713	57.09
Streaming servers (e.g. Twitch etc.)	2022	16.26	290	23.22
News portals	1692	13.60	400	32.03
Pornography websites	1375	11.05	141	11.29
Educational websites (Khan Academy, MOOC courses etc.)	868	6.98	208	16.65
On-line video chat services (e.g. Omegle, Ome.tv etc.)	765	6.15	106	8.49
Darknet websites	355	2.85	59	4.72
Violent content websites	312	2.51	145	11.61

On the other hand, the most visited social networking site is YouTube, which is followed by 90% of child respondents from both the Czech Republic and Poland. Other popular services include Facebook, especially Facebook Messenger and Instagram. Facebook is mainly used by older respondents, while Instagram dominates among the younger population (Table 2). Respondents from both countries also confirm the active use of the social network TikTok - 27.83% of child respondents in the Czech Republic and even 32.19% of respondents in Poland use it.

Table 2

Which social networks (services) do children actively use?

Social network/ service used	Absolute frequency	Relative frequency	Absolute frequency	Relative frequency
	(n)	(%)	(n)	(%)
	Czech Republic		Poland	
YouTube	11288	90.75	1183	94.72
Facebook	9403	75.6	1125	90.07
Facebook Messenger	9005	72.4	1095	87.67
Instagram	8689	69.86	928	74.30
E-mail	8358	67.2	971	77.74
WhatsApp Messenger	4395	35.34	N/A	
Snapchat	4018	32.3	814	65.17
TikTok	3461	27.83	402	32.19
Twitch	2667	21.44	208	16.65
Skype	2321	18.66	200	16.01
Viber	1930	15.52	28	2.24
Tellonym	1623	13.05	84	6.73
Twitter	1513	12.16	229	18.33
Omege	516	4.15	47	3.76
Ome.tv	147	1.18	34	2.72

Children and cyber aggression in the online environment

A separate part of the research was devoted to the occurrence of various forms of aggression that can escalate into cyberbullying and other toxic risk communication phenomena (blackmail, threats). The data obtained show that 41% of Czech children reported having experienced some form of online aggression in the last 12 months, while 33% of Polish respondents confirmed the same situation (Table 3). In most cases, the perpetrators of online aggression were classmates of the victim, either from the same class or school.

Table 3*Which types of aggression children encounter in the online environment?*

Aggression	Absolute frequency	Relative frequency	Absolute frequency	Relative frequency
	(n)	(%)	(n)	(%)
	Czech Republic		Poland	
Someone harmed me verbally through the Internet or a mobile phone	3466	27.87	89	7.15
Someone disseminated, through the Internet or a mobile phone, a photo intended to humiliate me, ridicule me or otherwise embarrass me	1464	11.77	61	4.90
Someone disseminated, through the Internet or a mobile phone, a private photo of myself	401	3.22	22	1.77
Someone disseminated, through the Internet or a mobile phone, a video intended to humiliate me, ridicule me or otherwise embarrass me	736	5.92	26	2.09
Someone has cheated you in an online environment (shopping, auction, advertisement, etc.)	943	7.58	31	2.49
Someone disseminated, through the Internet or a mobile phone, an audio footage intended to humiliate me, ridicule me or otherwise embarrass me	435	3.5	16	1.29
Someone threatened me or intimidated me through the Internet or a mobile phone	1246	10.02	47	3.78
Someone blackmailed me through the Internet or a mobile phone	697	5.6	32	2.57
Someone accessed, without my permission, my online account (e.g. e-mail, social network account etc.)	1609	12.94	42	3.38
Someone misused my on-line account to get me into trouble (e.g. harassed my friends in my name)	621	4.99	23	1.5
Someone registered a fake social network profile in my name	866	6.96	25	2.01

Sexting in the Czech-Polish border area.

Respondents from the Czech Republic confirmed that sexting in some of its forms is indeed practiced in the online world. 14.71% of Czech children confirmed that they perform sexting in text form, while 8.72% of respondents (1084 out of 12438), confirmed that they send an intimate photo or video of themselves to another person

on the Internet. Respondents from Poland also confirmed that they do or have done sexting in some of its forms in the past. Sexting in text form was confirmed by 20% of Polish respondents, sending intimate photos of themselves was confirmed by 10.16% of respondents, and 4.89% confirmed that they had sent an intimate video of themselves to someone else. Children most often send intimate material to their current (or former) boyfriend or girlfriend, current friends, or people they like and would like to establish a romantic relationship with.

Discussion and conclusion

The results of our comparison show that children in the Czech-Polish border region use similar types of online services. The dominant services are mainly social networks, servers focused on sharing video content, online encyclopaedias or gaming sites. Children's use of YouTube, Facebook Messenger, Instagram, WhatsApp, SnapChat or TikTok is particularly dominant. TikTok is more used mainly by Polish children (32.19%), however, in recent years the number of active users of this network has been growing both in Poland and the Czech Republic.

Children from the Czech Republic experience more verbal aggression in the online environment than respondents from Poland. However, most of the incidents experienced by children from both countries lasted less than a week and subsided more quickly. Serious forms of longer lasting aggression lasting for more than 1 year, for example, were confirmed by 6.31% of children in the Czech Republic and 6.13% in Poland. In addition to verbal aggression, both Czech and Polish children experienced situations in which someone else circulated humiliating photos (11.77% of children in the Czech Republic and 4.90% of children in Poland) or videos (6% in the Czech Republic, 2% in Poland) of them on the Internet over a 12-month period. This is consistent with previous studies where the incidence of cases has been increasing in recent years (Čechová & Hlistová, 2009; Hollá, 2013; Kováčová, 2012; Ortega et al., 2008).

Both Czech and Polish respondents also confirmed the occurrence of sexting - 8.72% of Czech respondents and 10.16% of Polish respondents shared intimate photos or videos of themselves with other Internet users. Thus, Polish respondents sexted more often than Czech respondents, and it was detected as a problem that carries risks for the student due to the misuse of these pictures, often to damage the child's image (Holla et al., 2018; Kopecký et al., 2014a).

Czech and Polish children experience other incidents in the online environment, which are often linked to online fraud and criminal activity on the Internet. 13% of Czech respondents and 7.7% of Polish respondents confirmed that they have been the target of fraud in the online world - they paid online for goods that never arrived. Czech and Polish children also confirmed that someone had stolen a virtual character or virtual object from their gaming accounts. This is a current problem that can lead to extortion, as warned by Kopecký and Szotkowski (2019).

Specifically, this paper has answered the stated objective and each of the research questions by linking the online risk behaviours of a large population of Czech and Polish students, which may be generalisable due to the large sample size. The richness

of this data provides great applicability for future studies on cyberaggression, both in the Czech and Polish context and beyond.

Finally, as future lines of research, it is recommended to continue investigating online risk behaviours and aggressions that have increased after the Covid-19 pandemic. This will initiate a more practical line of research related to the prevention of this type of behaviour that harms children.

Conflict of interest

The authors declare that they have no conflicts of interest. The funders had no role in the design of the study; in the collection, analysis or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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Authors' contributions

Conceptualization, K.K. and R.S.; methodology, G.G.; software, V.K; validation, V.K.; formal analysis, G.G.; research, K.K.; Resources, R.S.; data analysis, K.K.; original draft writing, K.K.; writing, revising and editing, G.G.; supervision, R.S.; project management, R.S.; financing acquisition, V.K., etc.

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