UPOTREBA MODERNIH TEHNOLOGIJA U SLUŽBI DIGITALNOG NASILJA KOD ĐAKA I STUDENATA

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THE USE OF MODERN TECHNOLOGIES IN DIGITAL VIOLENCE AGAINST PUPILS AND STUDENTS**

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Sažetak

Uvod/cilj: Današnji svet i njegovo funkcionisanje ne mogu se zamisliti bez proizvoda savremenih tehnologija. Prednosti njihove upotrebe su ogromne. Savremeni život predstavlja život sa puno brzih i velikih tehnoloških promena. Ove promene su, pored ostalog, uključile i upotrebu mnogih novih tehničkih uređaja koji koriste električnu energiju i proizvode elektromagnetno zračenje. Naravno, mobilni telefon, laptop i tablet predstavljaju jedan od najčešće korišćenih uređaja u poslednje vreme. Njihova upotreba ima mnogo koristi, vezanih za posao i život. Ali, pored koristi, postoje i neki takozvani loši efekti. Prva asocijacija na loše efekte u vezi sa savremenim električnim uređajima, pa tako i mobilnim telefonom, je elektromagnetno zračenje. Pored uočenih loših efekata, ovi uređaji se mogu koristiti u službi digitalnog nasilja i drugih loših oblika ponašanja ili kriminala. Ovaj rad je napisan da prikaže upotrebu mobilnog telefona, laptopa, desktopa i tableta u radu i životu učenika i studenata, potencijalnu izloženost učenika i studenata digitalnom nasilju i prisustvo i uticaj digitalnog nasilja kod učenika i studenata.

Metod: Istraživanja su obuhvatila 600 učenika niških osnovnih, 600 učenika srednjih škola, kao i 600 studenata fakulteta Univerziteta u Nišu.

Rezultati: Rezultati su pokazali veliki uticaj savremenih digitalnih uređaja u životu i radu ispitanika, posebno mobilnih telefona . Izloženost digitalnom nasilju ispitanika bila je veoma visoka (više od 80%

Abstract

Introduction/Aim: This research had three aims. The first aim was to show the review of noted digital devices in the life and work of pupils and students, their absence in the life and work of pupils and students so as to show the way of use of some devices. The second aim was to show possibility of exposure to digital violence for elementary and secondary schools' pupils and students. The third aim was to show the presence and influence of digital violence between pupils and students.

Methods: The survey method on population of 1800 respondents (600 pupils from elementary schools, 600 pupils from secondary schools and 600 students from University in Niš).

Results: Obtained results showed great influence of modern digital devices in the life and work of respondents, particularly mobile phones (every respondent had a mobile phone). The exposure to digital violence of respondents was very high (more than 80% of respondents used social networks with different degrees of exposure). Digital violence exists between respondents in a high degree (more than 70% of respondents were harassed by e-mail, phone or social networks).

Conclusion: Digital violence presents serious problem for respondents, and it is in the most cases conducted by mobile phone.

Keywords: modern technologies, pupils, students, digital violence, health

ispitanika koristilo je društvene mreže različitog stepena izloženosti). Digitalno nasilje među ispitanicima postoji u visokom stepenu (više od 70% ispitanika je uznemiravano putem e-pošte, telefona ili društvenih mreža).
Zaključak: Digitalno nasilje predstavlja ozbiljan problem za ispitanike, a sprovodi se u većini slučajeva putem mobilnog telefona.
Ključne reči: moderne tehnologije, đaci, studenti, digitalno nasilje, zdravlje

Introduction

Today`s humans are working and living in the life full of permanent, big and fast technological changes. Many modern devices are in use in everyday life. The benefits brought by those technologies and devices are so great that many of their users have never thought about potential so called bad effects. Very interesting fact is that the first research about potential bad effects of new technologies was about the electromagnetic radiation, and it was conducted in the sixties of the last century. A very big problem and bad effect of the influences of new technologies, as shown and proved, is known as digital violence. Related to research, digital violence is constantly increasing, although there were many different actions in the sense of reducing and elimination of digital violence. These results are confirmed in Serbia, in other countries all over Europe, even the world [1].

Digital violence is carried out with the help of new technologies. There are many examples of new technologies. Of course, one of the most used forms of new technology by pupils and students are mobile phones, laptops, desk top computers and tablets. At the beginning of their use, mobile phones presented just an effective resource of communication. In time, the technologies have advanced so the possibilities of mobile phones have significantly increased. Today, mobile phone presents powerful multimedia device. It can be used for different purposes, such as communication, as photo device, voice and clip recorder, navigation instrument, instrument for teaching and lot of other purposes. Of course, it is a very good fact, but, as research and experience showed, this device can be used for bad purposes. The number of mobile phones in use has overreached several billions a long time ago. The customers of mobile phones are of different ages, but in most cases, they are children and students. Children get used to mobile phones from a young age, creating a certain type of addiction [9]. Of course, the appearance of Internet and many different services that can be realised by Internet demands the use of device such is

mobile phone, but no limit was set in the sense of mobile phone use. Mobile phone is very available device with appropriate price and it is very easy for use. The mobile phone industry used devices that can be used by people without appropriate technical education. At early age, children are not aware of the power, possibilities and the seriousness of this device. In the big number of cases, mobile phone, laptop and tablet were used as a toy, without comprehending the fact that it inflicted the violence. On the other hand, many children who misused mobile phone and who got away without punishment, start to use this model of behaviour as normal, because they have „benefits". Favourable prices and availability of Internet enable children to always be „online ". Many different contents are available. During pandemic of COVID 19 virus, mobile phone, laptop, desktop and tablet was obligatory devices for many pupils and students; whether they wanted to or not, they had to use it.

It is obvious that, in the last years, teaching process has brought the increased use of modern technologies, such as mobile phone. Standard school resources are slowly starting to be changed by new and modern resources [2].

Despite all the noted benefits of mobile phone use, there are some very bad effects, in the physical and social sense that are constantly mentioned, but still the number of mobile phones used by children are constantly increasing. Firstly, one of the most frequently bad effects are electromagnetic radiation of the mobile phone. Of course, in mobile phone declarations, important values for electromagnetic radiation always will be below the legal limits (the strength of electric field [V/m], the strength of magnetic field [A/m], SAR-specific absorption rate [W/kg]), but this does not mean that mobile phone can be used 24 hours per day. There is one very important fact: the effects created by electromagnetic radiation are cumulated, what literally means that nervous system „does not forget "[3, 4].

From the social aspect, there are also a lot of problems and bad effects. Children use mobile

phones, laptops and tablets every day, permanently so it can be said that it is some kind of dependence. Without these devices, many of them are completely helpless - they don't know how to prepare food, how to make fire, how to find some street, how to entertain themselves or others and many other things. On the other hand, many of them use these devices as powerful weapon of digital violence [5, 8]. Many children from school age, even older children and people, do not understand that these devices were made to make life easier and better, not to use it for of digital violence. Digital violence presents every kind of violence caused by the use of digital technologies. With the possession of mentioned devices, approaching the world is very fast and easy. Internet, Facebook, Instagram and other social networks enable fast and good organisation and great possibilities in the sense of digital violence. Many bad examples are available. Possibility to have a power to control someone, to blackmail someone, to spy someone and other uncommitted activities are very tempting and easily achievable with a device such as mobile phone. Its role in the everyday life will be much bigger with the consequences, development and potentials of Industry 4.0, with the systems such as Cloud, IoT-Internet of things etc. Experience showed that law regulations have influence on digital violence, but it is still in progress. It is interesting that many schools begin to realise regulations about class without mobile phones - while they are in school, pupils are prohibited from using mobile phones. Research showed increasing level of digital violence, at all levels generally. Of course, children at early school age are very appropriate population for different bad influences that can lead to some form of digital violence. Children at early school age cannot even understand that they commit digital violence [6,7].

This paper was written to show the potential role of modern technologies in digital violence; to show the evidential problems of excessive use of the devices and Internet, Facebook, Instagram and similar social networks; to show the potential influence and interest of different possibilities for digital violence and potential exposure to digital violence for elementary school pupils, secondary school pupils and students from Niš.

Methodology

The research included pupil and student population during 2022 and 2023 in Niš. It consisted of 1800 pupils and students altogether; 600 pupils from elementary school in Niš, 600 pupils from secondary schools in Niš and 600 students from University of Niš. The research included both genders from all ages. Ages of respondents from elementary schools were from the first class to the eighth class (7 to 14 years). Ages of respondents from secondary schools were from the first class to the fourth class (15 to 18 years). Ages of respondents from University were from the first year to the fifth or sixth year (19 to 24 years). The research was conducted in the form of anonymous questionnaire. Questionnaire consisted of 20 questions, classified in three groups. The first group of seven questions was about general influence of digital devices in the life and work of pupils and students. The second group of seven questions was about potentials of exposure of digital violence for pupils and students. The third group of the last six questions was about influence and existence of digital violence against pupils and students.

The results obtained in this paper are just a small part of the different large longitudinal research and physical measurements related to the usage and impact of modern technologies and devices on pupils and students. This purported different measurements of electromagnetic influence of digital devices on different age humans; potential influences and consequences of exposure, presence and influence of digital violence among pupils and students. Different mathematical, statistical and survey methods were used in mentioned research. Concretely, for the purposes of this paper, the survey method and base statistical methods for results processing were used [7-10].

Results of research

The first question was about the possession of modern media-digital devices by pupils and students and research results about that are presented in table 1.

Table 1. The obtained results of the research about the possession of modern media-digital devices by pupils and students

Possession of modern media at pupils and students	Elementary school pupils		Secondary school pupils		Students		Total		Total (%)	
	yes	no	yes	no	yes	no	yes	no	yes	no
Mobile phone	600	0	600	0	600	0	1800	0	100.00	0.00
Laptop	532	68	579	21	592	8	1703	97	94.61	5.39
Desktop computer	583	17	594	6	534	66	1711	89	95.06	4.94
Tablet	287	313	268	332	113	487	668	1132	37.11	62.89

The second was about average time spent on some device (mobile phone, laptop, desktop computer and tablet) in one day and research results about that are presented in table 2.

Table 2. The results of the research about the average time spent on some device (mobile phone, laptop, desktop computer and tablet) in one day

Average time spent on determined device in one day		up to 60 minutes	up to 120 minutes	up to 180 minutes	over 180 minutes	do not possess
Elementary school pupils	Mobile phone	0	15	34	551	0
	Laptop	92	228	178	34	68
	Desktop computer	513	59	9	2	17
	Tablet	234	53	0	0	313
Secondary school pupils	Mobile phone	0	15	34	551	0
	Laptop	178	245	100	56	21
	Desktop computer	505	78	11	0	6
	Tablet	263	5	0	0	332
Students	Mobile phone	156	277	89	67	11
	Laptop	4	178	89	321	8
	Desktop computer	463	56	6	9	66
	Tablet	113	0	0	0	487

The third question was about the way of mobile phone is used daily and research results about that are presented in table 3.

Table 3. The results of the research about the ways of mobile phone use

	close to the ear (n/%)		headphones/ Bluetooth (n/%)		Speakerphone (n/%)	
Elementary school pupils	426	71.00	134	22.33	40	6.67
Secondary school pupils	411	68.50	167	27.83	22	3.67
Students	349	58.17	217	36.17	34	5.67
Total	1186		518		96	
Total (%)	65.89		28.78		5.33	

The fourth question was about the way of laptop is used daily and research results about that are presented in table 4.

Table 4. The results of the research about the ways of laptop use

	on the lap (n/%)		on the desk or other pad (n/%)		Do not possess (n/%)		Total	Total (%)
Elementary school pupils	405	76.13	127	23.87	68	11.33	600	100
Secondary school pupils	345	59.59	234	40.41	21	3.50	600	100
Students	277	46.79	315	53.21	8	1.33	600	100
Total	1027		676		97		1800	100
Total (%)	57.06		37.56		5.39			100

The fifth question was about the most frequently used device for Internet and social media access and research results about that are presented in table 5.

Table 5. The results of the most frequently used device for Internet and social media access

	Mobile phone	Laptop	Desktop computer	Tablet	Total	Total (%)
Elementary school pupils	413	119	45	23	600	100
Secondary school pupils	352	147	67	34	600	100
Students	58	504	11	27	600	100
Total	823	770	123	84	1800	100
Total (%)	45.72	42.78	6.83	4.67		100

The sixth question was about the most frequently used device for learning and research results about that are presented in table 6.

Table 6. The results of the most frequently used device for learning

	Mobile phone	Laptop	Desktop computer	Tablet	Total	Total (%)
Elementary school pupils	229	59	311	1	600	100
Secondary school pupils	56	399	145	0	600	100
Students	15	553	32	0	600	100
Total	300	1011	488	1	1800	100
Total (%)	16.67	56.17	27.11	0.06		100.00

The seventh question was about the most frequently used device for leisure (music, film, video games and similar) and research results about that are presented in table 7.

Table 7. The results of the most frequently used device for leisure (music, films, video games and similar)

	Mobile phone	Laptop	Desktop computer	Tablet	Total	Total (%)
Elementary school pupils	255	145	111	89	600	100
Secondary school pupils	145	328	85	42	600	100
Students	295	219	32	54	600	100
Total	695	692	228	185	1800	100
Total (%)	38.61	38.44	12.67	10.28		100

The eighth question was about social networks between pupils and students and research results about that are presented in table 8.

Table 8. The results of the social networks between pupils and students

	Facebook	Instagram	YouTube	LinkedIn	Twitter	Tick Tack	None	Other
Elementary school pupils	212	336	467	2	23	365	0	5
Secondary school pupils	345	495	567	49	112	56	0	12
Students	389	511	600	407	234	27	0	87
Total	946	1342	1634	458	369	448	0	104
Total (%)	52.56	74.56	90.78	25.44	20.50	24.89	0	5.78

The ninth question was about reasons for Internet use by pupils and students and research results about that are presented in table 9.

Table 9. The results about reason for Internet use

	Education and learning	Work	Social networks	Communication	Fun	Other
Elementary school pupils	112	22	534	600	417	37
Secondary school pupils	199	78	515	600	489	32
Students	496	317	436	600	303	45
Total	807	417	1485	1800	1209	114
Total (%)	44.83	23.17	82.50	100.00	67.17	6.33

The tenth question was about personal information visibility and accessibility on Internet and research results about that are presented in table 10.

Table 10. The results about personal information visibility and accessibility on Internet

	Name, surname, nickname or callsign	Home address	e-mail	School or Faculty	Profile photo	Do not have any profile
Elementary school pupils	589	267	567	412	504	0
Secondary school pupils	546	124	523	367	478	0
Students	456	87	514	307	356	0
Total	1591	478	1604	1086	1338	0
Total (%)	88.39	26.56	89.11	60.33	74.33	0.00

The eleventh question was about the way of use of own or borrowed digital devices and their protection and research results about that are presented in table 11.

Table 11. The results about the way of use of own or borrowed digital devices and their protection

	I use only my devices	I use someone's devices	I allow someone to use my devices	My devices are passwords protected
Elementary school pupils	314	286	201	412
Secondary school pupils	378	222	215	501
Students	511	89	26	499
Total	1203	597	442	1412
Total (%)	66.83	33.17	24.56	78.44

The twelfth question was about the way of use of profiles on Internet and their protection and research results about that are presented in table 12.

Table 12. The results about the way of use of profiles on Internet and their protection

	I use only my profiles on Internet	I use someone's profiles on Internet	I allow someone to use my profiles on Internet	My profiles are completely protected	My profiles are partially protected	My profiles are unprotected
Elementary school pupils	467	133	104	422	94	84
Secondary school pupils	534	66	50	511	67	22
Students	509	91	23	545	42	13
Total	1510	290	177	1478	203	119
Total (%)	83.89	16.11	9.83	82.11	11.28	6.61

The thirteenth question was about requests for contact and friendships on Internet and research results about that are presented in table 13.

Table 13. The results about requests for contact and friendships on Internet

	Accept requests from anyone	Accept requests only in the case when common friends exist	Accept requests only if they are known	Accept requests only if they are well known	Total	Total (%)
Elementary school pupils	156	349	84	11	600	100
Secondary school pupils	97	267	146	90	600	100
Students	29	195	198	178	600	100
Total	282	811	428	279	1800	100
Total (%)	15.67	45.06	23.78	15.50		100.00

The fourteenth question was about the behaviour on Internet and research results about that are presented in table 14.

Table 14. The results about behaviour on Internet

	Visited unchecked site or page	Downloaded unknown content	Got a virus from Internet	Posted some content on the Internet
Elementary school pupils	256	424	536	478
Secondary school pupils	245	411	534	456
Students	67	402	391	401
Total	568	1237	1461	1335
Total (%)	31.56	68.72	81.17	74.17

The fifteenth question was about the digital violence term understanding and research results about that are presented in table 15.

Table 15. The results about digital violence term understanding

	I know what digital violence is	I am not sure what digital violence is	I don't know what digital violence is	Total	Total (%)
Elementary school pupils	418	178	4	600	100
Secondary school pupils	578	22	0	600	100
Students	598	2	0	600	100
Total	1594	202	4	1800	100
Total (%)	88.56	11.22	0.22		100.00

The sixteenth question was about the understanding of some types of digital violence and research results about that are presented in table 16.

Table 16. The results of the research about the understanding of some types of digital violence

Digital violence forms	The understanding of digital violence per class	Elementary school pupils	Secondary school pupils	Students
Denigration	I know what that is	178	465	600
	I don't know what that is	422	135	0
	I have seen an example of this type of digital violence	3	12	4
	I have heard an example of this type of digital violence	4	21	19
Harassment	I know what that is	411	568	600
	I don't know what that is	189	32	0
	I have seen an example of this type of digital violence	101	122	34
	I have heard an example of this type of digital violence	143	178	56
Exclusion	I know what that is	467	584	600
	I don't know what that is	133	16	0
	I have seen an example of this type of digital violence	79	101	9
	I have heard an example of this type of digital violence	92	169	27
Impersonation	I know what that is	504	594	600
	I don't know what that is	96	6	0
	I have seen an example of this type of digital violence	145	197	34
	I have heard an example of this type of digital violence	169	234	82
Sexting and Sextortion	I know what that is	456	578	600
	I don't know what that	144	22	0
	I have seen an example of this type of digital violence	11	4	5
	I have heard an example of this type of digital violence	94	99	63

The seventeenth question was about the reactions of pupils and students to digital violence in case they were to witness it and research results about that are presented in table 17.

Table 17. The results of the research about their reactions to digital violence if they were to witness it

What would you do in case you saw or heard about digital violence	Elementary school pupils	Secondary school pupils	Students	Total	Total (%)
I would report it	411	554	592	1557	86.50
I wouldn't report it	23	15	5	43	2.39
I am not sure what would I do	166	31	3	200	11.11

The eighteenth question was about the way of harassment and research results about that are presented in table 18.

Table 18. The results of the research about the ways of harassment

Ways of harassment	Elementary school pupils	Secondary school pupils	Students	Total	Total (%)
Harassed by SMS messages	387	311	267	965	53.61
Harassed by phone calls	456	427	393	1276	70.89
Harassed by e-mails	501	504	487	1492	82.89
Harassed by social networks	532	545	496	1573	87.39
Harassed by viruses	367	301	403	1071	59.50
Other way of harassment	194	111	94	399	22.17
Never harassed	4	2	0	6	0.33

The nineteenth question was about the visiting, watching or listening to sexual, pornographic or violent content and research results about that are presented in table 19.

Table 19. The results of the research about visiting, watching or listening to sexual, pornographic or violent content

Visiting, watching or listening to sexual, pornographic or violent content, per class	Elementary school pupils	Secondary school pupils	Students	Total	Total (%)
Have you ever visited site with explicit sexual or pornographic content	478	398	327	1203	66.83
Have you ever played video game with violent, sexual or pornographic content	411	311	307	1029	57.17
Have you ever watched a movie with violent, sexual or pornographic content	478	432	398	1308	72.67
Have you ever listened to the music with violent, sexual or pornographic content	104	122	82	308	17.11

The twentieth question was about pupils and student's opinion if they have ever committed digital violence with or without intent and research results about that are presented in table 20.

Table 20. The results of the research about pupils and student's opinion if they have ever committed digital violence with or without intent

	Elementary school pupils	Secondary school pupils	Students	Total	Total (%)
I am sure	74	78	94	246	13.67
I am not sure	278	300	193	771	42.83
I don't care	56	67	42	165	9.17
No	192	155	271	618	34.33

Discussion of the results

The research results related to the general use and influence of modern technologies is that devices have a great influence on pupils and students and that they use modern technologies pretty much.

The research results related to the possession of modern media: mobile phones, laptops, desk top computers and tablets presented in Table 1 showed that the most popular digital media among pupils and students is mobile phone, which all respondents owned.

The research results related to the average time spent on some digital media in one day, presented in Table 2, showed that the largest number of pupils from elementary and secondary schools spent their time on their mobile phones (1102 pupils or 91.8 percentage from all pupils spent more than three hours on their mobile phones). The most of students spent their daily time on laptops (more than 50 % spent more than three hours on their laptops). The least amount of time was spent on tablets by pupils and students.

The research results related to way of mobile phone use, presented in Table 3, showed that the biggest number of all respondents use mobile phone close to the ear (65.89%), while the smallest number of respondents use mobile phone over speaker (barely 5.3%), what presents the safest way of mobile phone use, because in that case electromagnetic radiation has the smallest effect on them.

The research results related to way of laptop use, presented in Table 4, showed that most of respondents use laptop on their laps (57 %), what presents exactly the way that laptop must not be used.

The research results related to the most frequent digital device used for social networks and Internet approach, presented in Table 5, showed that most of the pupils (63.70% of all pupils) use mobile phone, while the students use laptop (84%).

The research results related to the most frequent digital device used for learning, presented in Table 6, showed that most of respondents use laptop (56.17% of all respondents) while mobile phone, while the tablet presents the least used device for learning (0.06 % from all respondents).

The research results related to the most frequent digital device used for leisure (music, films, video games and similar), presented in Table 7, showed that most used devices for recreation were mobile phone and laptop (almost 38 % each from all respondents).

The research results related the social networks representation between pupils and students, presented in Table 8, showed that the most represented social network by all respondents was YouTube (90.78%). Instagram presents the second most popular social network between all respondents (74.56%), while the social network with the smallest number of followers is Twitter (20.5%).

The research results related to the results about reasons for Internet use, presented in Table 9, showed that all of respondents use Internet for communication; 82.5% of all respondents use Internet for social networks; 67.17% of all respondents use Internet for fun; 44.83% of all respondents use Internet for education and learning; 23.17% of all respondents use Internet for work and 6.33% of all respondents use Internet for other purposes.

The research results related to the personal information visibility and accessibility on Internet, presented in Table 10, showed great availability of pupils and students' information. 89.11% of all respondents have e-mails visible; 88.39% of all respondents have name, surname, nickname or call sign visible; 74% of all respondents have their profile picture visible; 60.33% of all respondents have their schools and faculties names visible and 26.56% of all respondents have their addresses visible.

The research results related to the way of use of own or borrowed digital devices, presented in Table 11, showed that 66% of all respondents use only their digital devices; 33.17% of all respondents use someone's digital devices while 24.56% allow someone to use their device. 78% of all respondents use password protected digital devices.

The research results related to the way of use of their profiles on Internet, presented in Table 12, showed that most of the pupils and students use their own profiles (83.89%). Also, most of them are sure that their profiles are protected (82.11%).

The research results related to the contacts and friend request on Internet, presented in Table 13, showed that 15.67 % of them would accept friend request or contact request from anyone, which is not good and safe. Most of them would accept friend request or contact request only if they have common friends (45.06%) or if they are known or well known (about 39%).

The research results related to the behaviour on Internet, presented in Table 14, showed that 31.56 % of all respondents visited unchecked sites or pages, while even 81.17% of them got some virus, which also implies accessing unchecked content, site or page.

The research results related to the understanding of the digital violence term, presented in Table 15, showed that most of them know what term of digital violence presents (88.56%).

The research results related to different forms of digital violence, presented in Table 16, showed that most of them know what some form of digital

violence is. The most famous form of digital violence related to the research was Impersonation (even 94.33 % of respondents know what that is). The smallest percentage of respondents was in the case of Trickery, where 61.94 % of all respondents know what that is.

The research results related to what would they do in case they were to see or hear about some form of digital violence, presented in Table 17, showed that most of them would report it (about 86.5 %), while only 2.39% would not report it.

The research results related to the potential ways of harassment, presented in Table 18, showed that the biggest number of all respondents were harassed on social networks (87.39%), while the smallest number of them were harassed with some other ways of harassment. The percentage of respondents that have never been harassed was 0.33%.

The research results related to about visiting, watching or listening to sexual, pornographic or violent content, presented in Table 19, showed that most of all respondents watched a movie with violent, sexual or pornographic content (72.67%). The least interest was shown for music with violent, sexual or pornographic content (17.11%).

The research results related to their (pupils and student's) opinion if they have ever committed digital violence with or without intent, presented in Table 20, showed that 13.67 % of them, or 246 were sure that they have committed some form of digital violence. 42.84 % of them were not sure, which could be problematic, because experience showed that most of them expressed themselves as not sure if they actually have done it. About 1/3 of all respondents were sure that they have never committed some form of digital violence.

In comparison with similar results, the conducted research mostly confirmed many hypothesis and assumptions. The most frequently used digital device is mobile phone. The digital violence is present between respondents in high degree and it is important to note that use of digital devices and digital violence show the constant increase. Positive facts were that most of respondents would report digital violence and that they know, regardless of high exposure, how to use the needed methods and procedures in terms of protection. The use of digital devices for digital violence is obvious and it must be treated and eliminated with powerful pedagogic and legal measures [1], [11], [12], [13].

Conclusion and future research

The research has showed that modern technologies, such as mobile phones, laptop and desktop computers have a great part in the of respondents (pupils and students) life and work. Tablet presents the modern technology with definitely the smallest influence on respondents. Beside all benefits, these facts show many bad effects, in the sense of physical and mental health. Bigger and more frequent use of these devices can be very problematic. Mobile phone has electromagnetic field and produces electromagnetic radiation what could cause serious health consequences, in the physical sense. Although this device can be used safely (use of speaker) most of the pupils and students use this device directly on the ears or with headphones, what also can cause weaker hearing.

Laptop also presents very frequently used device in the life and work of pupils and students, but this device was also used wrongly, by more than 50 % of all respondents on the lap, which also could cause serious health consequences, especially for male population.

Noted devices, actually their excessive use also can cause other consequences, very bad for health of pupils and students. The use of this devices enables digital violence. Results obtained in this, and other papers showed that in Serbia, but also and in other countries, pupils and students are exposed to digital violence. They are living in the digital world, partially virtual; it is obvious that pupils in elementary school especially, but also and pupils in secondary schools and students are not prepared in the mental, moral and psychological sense for the use of mentioned devices. Those devices can present dangerous weapons because of their potentials; there are many educational, care, legal regulations and other safety precautions that should be realised to decrease digital violence.

This paper was written also to show the potential way of digital violence monitoring - it is important to research pupils and students' population in order to gain precise data and to know what precautions and actions should be realised. Future investigation will certainly purport more detailed research, serious and permanent education and monitoring, physical measuring of relevant parameters, planned and prepared lectures, seminars and similar education potentials.

References

1. Popadić and Kuzmanović. Korišćenje digitalne tehnologije, rizici i zastupljenost digitalnog nasilja među učenicima u Srbiji. Beograd: Ministarstvo prosvete, nauke i tehnološkog razvoja; 2013.

2. Ranđelović M, Jevtić R, Janković I. Digital Transformation of the Teaching Process Using Mobile Devices and Dedicated Software, 2022. Path to a Knowledge Society-Managing Risks and Innovation PaKSoM 2022, 4th International Virtual conference.

3. Jevtić D, Jevtić R, Ničković J, Ničković V. Rezultati simulacije elektromagnetnog polja u regionu glave dece uzrasta od 10 godina. Zdravstvena zaštita. 2010;39(4):47-50. doi: 10.5937/ZZ1004047J

4. Jevtić BR, Ničković TJ, Jevtić DD. SAR i termički efekti mobilnih telefona, Tehnika elektrotehnika. 2011;(1):95-9.

5. Jevtić BR, Jevtić DD. Uticaj modernih tehnologija na život i rad školske dece, Učenje i nastava. 2015;(2):383–98.

6. Jevtić BR, Jevtić DD. Termički efekti u korišćenju laptopova, Učenje i nastava. 2016;(2):393-404.

7. Jevtić BR. Digital Violence and the Role of Different Factors in Its Prevention and Sanction in Serbia. Zbornik radova Pedagoškog fakulteta u Užicu. 2020;(22):195-12. doi: 10.5937/ZRPFU2022195J.

8. Jevtić RB. The use of modern technologies in the life and work of teachers before and during Covid virus. Zbornik radova Pedagoškog fakulteta, Užice. 2021(23):151-66.

9. Jevtić R, Jevtić D. The Internet Addiction as A Problem in School Age Children, Zdravstvena zaštita. 2019;48(3):49-5.   doi:10.5937/ZZ1903049J, 2019,

10. Jevtić B.R. Digital Violence Among Secondary School Pupils, Zbornik radova Pedagoškog fakulteta u Užicu. 2022;(22):45-62. doi:10.5937/ZRPFU2224045J

11. Ignjatović V. Istraživanje prisustva elektronskog nasilja u populaciji učenika osnovnih škola na teritoriji Beograda. Master rad. Univerzitet Singidunum, Beograd.2018.

12. Milovanović S. Nasilje na Internetu – kriminološki aspekt. Master rad. Univerzitet u Nišu, Pravni fakultet, Niš;2019,

13. Jevtić R, Janković I. Exposure of the students of the secondary school of electrical engineering "Nikola Tesla" to wireless electromagnetic radiation. Zdravstvena zaštita. 2022;51(4):106-23. doi:10.5937/zdravzast2204106J

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