Internet risk behaviors among adolescents with visual impairment

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Background: Young individuals with visual impairment (VI), exposed to higher risk of social exclusion, might be more prone to Internet risky behaviors including electronic aggression. Objective:Different types of Internet risk behaviors and the average time spent online were investigated among students with VI. These behaviors were analyzed for the relationship with witnessing, perpetrating and becoming a victim of electronic aggression. Methods: 490 special needs school students with VI answered a self-administered questionnaire. The average time spent online, different types of risky Internet activities and electronic aggression were recorded, as well as sociodemographic characteristics. Results:Male students downloaded software illegally, hacked, published and viewed sites with sexual content, and gambled online statistically more often than female counterparts. Concerning electronic aggression, about 52% of study participants were engaged as witnesses, every fifth student as a victim and 11.6% as perpetrators. Two sets of ordinal logistic regression analyses have shown that communication with a person promoting violence and an excessive amount of time spent online during weekends predicted significantly the risk of witnessing and being a victim of electronic aggression. Additionally, communicating with a person promoting violence and an excessive amount of time spent online during schooldays were associated with increased odds for engagement in electronic aggression as perpetrator. Conclusions: Population with VI is prone to risky Internet use and likely to be engaged in electronic aggression. New instruments and preventive strategies need to be developed, as well as diagnostic tools tailored specifically to the needs of young people with VI.

1 **Internet risk behaviors among adolescents with visual impairment**

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31 **ABSTRACT**

32 Background: Young individuals with visual impairment (VI), exposed to higher risk of social

33 exclusion, might be more prone to Internet risky behaviors including electronic aggression.

34 Objective: Different types of Internet risk behaviors and the average time spent online were

35 investigated among students with VI. These behaviors were analyzed for the relationship with

36 witnessing, perpetrating and becoming a victim of electronic aggression.

37 Methods: 490 special needs school students with VI answered a self-administered questionnaire.

38 The average time spent online, different types of risky Internet activities and electronic aggression

39 were recorded, as well as sociodemographic characteristics.

40 Results: Male students downloaded software illegally, hacked, published and viewed sites with

41 sexual content, and gambled online statistically more often than female counterparts. Concerning

42 electronic aggression, about 52% of study participants were engaged as witnesses, every fifth

43 student as a victim and 11.6% as perpetrators. Two sets of ordinal logistic regression analyses have

44 shown that communication with a person promoting violence and an excessive amount of time

45 spent online during weekends predicted significantly the risk of witnessing and being a victim of

46 electronic aggression. Additionally, communicating with a person promoting violence and an

47 excessive amount of time spent online during schooldays were associated with increased odds for

48 engagement in electronic aggression as perpetrator.

49 Conclusions: Population with VI is prone to risky Internet use and likely to be engaged in

50 electronic aggression. New instruments and preventive strategies need to be developed, as well as

51 diagnostic tools tailored specifically to the needs of young people with VI.

52 **KEYWORDS**

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64   **Internet risk behaviors among adolescents with visual impairment**
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66   **Introduction**

67   Online activities play a crucial role in adolescents' daily life, transforming, both qualitatively and

68   quantitively, the ways in which they socialize and learn [1, 2]. According to results of the EU Kids

69   Online project, social networking services (SNS), video/audio conferencing tools, games, movie

70   watching and listening to music are used most often every or almost every day by teenagers [3].

71   The Internet, with multiple websites and applications allowing for a quick exchange of

72   information, has become a learning tool and platform. As demonstrated by EU KIDS report 60%

73   of school students use the Internet for doing homework, preparing for tests, and expanding

74   knowledge needed for school [3].

75   There are, however, also negative aspects associated with ICT and digital communication.

76   Tahiroglu et al. [4] argue that the Internet has a negative impact on adolescents' psychosocial

77   development due to the fact that it is time-consuming and uncontrollable. As posited by social

78   compensation theory, negative life events can enhance motivation to go online to relieve negative

79   feelings [5]. In this context, the Covid-19 pandemic and the resulting spatial distancing, along with

80   the introduction of distance learning solutions, has caused anxiety, thus leading to excessive

81   Internet use [6]. Despite enabling various forms of mediated interactions, information exchange,

82   as well as constructive and collaborative activities, cyberspace with its technological affordances

83   has also become an environment where harmful and violent content of all kinds can be accessed,

84   generated, amplified and distributed [7, 8]. Electronic aggression is indeed one of the most

85   important online phenomena to which young Internet users are exposed. A recent study by EU

86   Kids Online project showed that among those who faced aggression off-line only about 30% of

87   teenagers have never been affected by aggression via the Internet, and also about of people aged

88   9-17 were never perpetrators of an electronic aggression [3].

89   As posited by Media Proximization Approach (MPA) the transgression of spatial and temporal
90   boundaries made possible thanks to the techno-discursive design of digital media not only enables
91   and facilitates user-to-user interaction, but also allows users to access, generate and share media
92   content [9-12]. Interactivity and connectivity translate into greater emotional involvement.
93   Technically, the Internet and social media encourage [8] the spread of emotionally loaded content
94   in a way that cannot be controlled. Anonymity is a key factor here. The Social Identity Model of
95   Deindividuation Effects [13] points to serious cognitive consequences of anonymity in online
96   interactions including various forms of anti-social behavior, such as flaming, trolling and other
97   forms of online incivility [14]. Deindividuation experienced due to perceived anonymity may thus
98   enhance disinhibition: individuals act like they would never do in face-to-face communication
99   [11]. MPA argues that technologically-enabled changes in distance dynamics (involving
100 interactivity patterns and anonymity), make potential victims of online aggression more accessible
101 to perpetrators and vulnerable to the attacks [12]. Likewise, they also make young Internet users
102 more prone to online risk behaviours, in terms of both exposure and performance. Mubarak
103 classifies risk-taking behaviours into three categories, namely dangerous interactions with people,
104 accessing dangerous websites and other risk-taking behaviours [15]. The best-known typology of
105 online risk behaviours was developed for EU KIDS Online research [2, 16] and adapted by Polish
106 authors [17]. It includes two dimensions – type of online activities (content-based activities,
107 contact- or communication-based activities, and conduct or peer-participation activities) and type
108 of risk (aggressive, sexual, values, and commercial). Numerous other studies investigated
109 adolescents in the context of cyber aggression or cyberbullying [18,19], sexually explicit content
110 [20, 21], and self-harm activities [22]. The factors that affected susceptibility to online risk
111 behaviours included age, gender, parental control, as well as parents' education level. Study results
112 showed that girls, older teenagers, and those whose parents have low education experience risky
113 online behaviors more frequently [23, 24]. Additionally, girls are more frequently exposed to
114 information about self-harming, ways of committing suicide or extreme weight loss, while boys
115 more often search for online pornography [21, 23].
116 A number of studies discuss the use of the Internet by adolescents with disabilities [25, 26]. Young
117 people with physical disability are excluded from participation in the society because of
118 restrictions in daily life, such as self-care, reduced mobility, or communication activities. The
119 Internet considerably enhances the degree of their participation in the social life [26]. The Internet

120   is the main e-resource providing students with VI with an opportunity to work independently,

121   when compared to traditional methods [27].

122   Young people with chronic health diseases and disabilities are more likely to become victims of

123   peer harassment [28]. Negative body image, reduced self-esteem, decreased social and

124   communication skills or poor academic performance have been identified as the main predictors

125   of being a target of victimization in this group [29]. Although, the prevalence rate of bullying

126   depends on illness or disability, the highest risk of victimization was observed among children

127   with VI [29]. Moreover, the preliminary study [30] also confirmed that students with VI are prone

128   to on-line risky behaviours, with boys being more likely to download files illegally, hack or watch

129   pornography than girls.

130   While it seems necessary to understand motivations behind both risky behaviours and online

131   aggression among people with disabilities, studies on Internet use among adolescents with VI are

132   still scarce. The present study, focusing on the frequency and nature of Internet use among students

133   with VI, aims to fill this gap. Our objective is to examine the complex relationship between online

134   risky behaviours and categorical variables of being a victim, a witness or a perpetrator of electronic

135   aggression, as well as time spent on the Internet.

136   **Material and Methods**

137   The study group (SG) was recruited from 490 students with VI (boys: 259; girls: 231), aged 13-24

138   years (17.9±2.48). The students who admitted to using the Internet were blind (N=70; 14.3%) or

139   partially sighted (N=420; 85.7%). The selection procedure comprised several stages. Firstly,

140   schools were randomly selected from nine Polish special-needs schools for the blind and partially

141   sighted. All students from the lower-secondary and upper-secondary classes were invited to

142   participate in the study. The inclusion criteria for students were as follows: confirmation of VI

143   according to International Classification of Diseases (ICD-10, 2014), presence during the day of

144   data collection and formal consent to take part in the study, also from parents in the case of students

145   under 18. Parents and participants received written information about the study with the consent

146   form before the survey. The approved and signed consent in the paper form had to be delivered to

147   persons supervising the administrative course and it was a prerequisite for inclusion in the study.

148   The only exclusion criterion was the presence of a diagnosed physical or mental disability other

149   than VI. The students from the study group were divided into two groups: the lower-secondary

150   students (N=157; 32.0%) and upper-secondary students 333(68.0%).

151 The examinations were conducted under the guidance of a trained team: a public health specialist

152 and a psychologist. A self-administered questionnaire was constructed and prepared in Braille or

153 large font for the needs of this study. In the questionnaire, the sociodemographic variables such

154 as: gender, age and type of school were collected. The mean time of Internet sessions including

155 time spent during school days and weekends in minutes was recorded. Frequency of online

156 activities, such as communicating via the Internet, SNS, discussion forums, uploading of MP3,

157 music or software files, e-mails, searching for information for learning purposes, online shopping,

158 blogs, and online gaming were considered when the nature of the Internet use was described [30].

159 Types of Internet activities involving risky behaviours (downloading the software illegally without

160 a valid license, publication of photos and movies on YouTube without permission of their owners,

161 hacking, communication with a person promoting violence, posting information about sex,

162 viewing websites with sexual content and gambling online) were also taken into consideration

163 [30].

164 Our primary objective was to describe tendencies regarding electronic aggression among young

165 people performing three roles: perpetrators, participants, victims. A perpetrator was defined as a

166 person who has threatened or offended another person via the Internet. Victims were persons who

167 have been threatened or offended by another person and a witness was a person who has been

168 exposed to the situation in which someone was threatening or offending other people via the

169 Internet [31].

170 The nonparametric Mann-Whitney U-test was used to compare subgroups with regard to the time

171 of using the Internet. The assessment of the frequency of risky behaviours and ways of using the

172 Internet was made using the chi-square test of independence. In the case of fewer than 5 cases the

173 Yates correction was included.

174 To determine whether electronic aggression (being a perpetrator, a victim, or a witness) could be

175 predicted by risky Internet behaviors, ordinal logistic regression analyses were conducted. The

176 criterion for inclusion of the predictors in the final logistic regression models was based on

177 performing initially separate logistic regression equations with one explanatory variable. Based

178 upon the significance level (p<0.05), the predictor was either used in the final model with multiple

179 predictors or excluded from further analyses (p<0.05). P-value lower than 0.05 was considered to

180 be significant.

181

182   **RESULTS**

183   **The frequency and nature of Internet use**

184   The mean time dedicated to Internet use was longer during school-free days compared to school

185   days (193.0 min ± 222.9 vs 88.3 min ± 123.8; z=14.414; p=0.000) in the total group. Boys spent

186   more time on the Internet than girls both during school days (97.8 min. ± 140.9 vs 77.7 min ±100.7;

187   z=1.841; p=0.064) and during weekends (207.2±234.4 min vs 176.6 min ±208.1; z=2.057;

188   p=0.04). Students from upper-secondary schools spent more time on the Internet than their peers

189   from lower-secondary schools during school days (96.6±135.2 min vs 70.0 min ± 91.7; z=2.103;

190   p=0.035) and during school-free days (202.4 min ±209.3 vs 172.2 min ± 228.4; z=2.544; p=0.011).

191   Half of the students used the Internet always or almost always for social networking or to obtain

192   information needed for school. Girls used SNS statistically more often than boys, but male students

193   downloaded MP3, software or music files or commented on discussion forums statistically more

194   often than girls. There were no statistical differences between lower and upper- secondary school

195   students in almost all types of Internet use. The only difference concerned the fact that students

196   from upper-secondary schools read or sent more e-mails (N= 66; 20.8% vs N=15; 9.9%;

197   chi^2=14.325; p=0.0008, respectively] and they also statistically more often used computer to obtain

198   information for knowledge development [N=176; 55.3% vs N=47; 31.3%; ch^2=23.38; p=0.00001]

199   than students from lower-secondary schools (Table 1).

200

201   **Online risky behaviours**

202   In the study group, using music files and software without a license (N=161; 34.2%) and viewing

203   online sexual sites (N=69; 14.4%) were most frequently indicated as performed sometimes or

204   regularly. Boys undertook all risky behaviours more often than girls. They statistically more often

205   downloaded the software illegally and hacked, published, and viewed sites with sexual content and

206   gambled online (Table 2).

207   Students from upper-secondary schools downloaded software illegally always/almost always

208   statistically more often than those from lower-secondary schools [N=32 (9.9%) vs N=11 (74%);

209   p= Chi^2=12.596; p=0.0018] and younger students more often resorted to hacking than older

210   students [(N=8, 5.3% vs N=10, 3.1%; Chi^2=5.652; p=0.059)]. They chose "always" or "almost

211   always" with reference to publishing information regarding sex or viewing sexual sites on the

212   Internet more often than older students but these differences were not statistically significant

213   (N=11; 3.4% vs N=3; 2%; N=12; 3.7% vs N=1.3%, respectively. On the other hand, younger

214   students declared that during online sessions they always or almost always communicated with

215   people promoting violence (N=5; 3.3% vs N=9; 2.8%) and resorted to hacking (N=8; 5.3% vs

216   N=10; 3.1%) more often than students from high schools.

217

218   **Electronic aggression**

219   In the study group almost 52% (N=241) of students witnessed someone experiencing some form

220   of violence on the Internet. Every fifth student (N=98) faced being a victim, and almost 12%

221   (N=56) of them were perpetrators of threating or offending on the Internet. Although boys had

222   higher scores in every dimension of aggression more often than girls, there were no statistically

223   significant differences according to gender (Table 3). There were also no statistical differences

224   between students from lower- and upper- secondary schools regarding frequency of being a

225   witness, a victim or a perpetrator of electronic aggression.

226

227   **Ordinal logistic regression models explaining electronic aggression**

228   In order to identify the predictors of electronic aggression (witnessing), the following variables

229   were included in multiple logistic regression: downloading the software illegally without valid

230   license, hacking, communication with a person promoting violence, viewing sexual images online

231   and amount of time spent on the Internet during school days and weekends. It was shown that two

232   out of four variables had significant predictive power for distinction between witnessing or non-

233   witnessing electronic aggression. Those included: communication with a person promoting

234   violence and the amount of time spent on the Internet during school or school-free days. It was

235   shown that those who communicate occasionally with a person promoting violence are three times

236   more likely to be engaged in electronic aggression as a witness when compared to those who do

237   not have such experience (OR=3.07; p<.05). No significant relationship was found between

238   communicating frequently with a person promoting violence and being exposed to electronic

239   aggression as an observer (OR=1.97, p>.05). It turned out - the ratio was approximately four to

240   one - that the excessive Internet use during weekends (over four hours per day) would be

241   associated with observing electronic aggression (OR=3.81; p<.01). Spending between two to four

242   hours online per day during weekends did not significantly affect witnessing electronic aggression

243   (OR=1.97, p<.05). The ratios for other variables were not significant (Table 4).

244 In the ordinal regression model, it was determined which independent variables had statistically

245 significant effect on being engaged in electronic aggression as a victim. The ratio for pupils

246 communicating occasionally with those who promote violence and, in this way, becoming the

247 victims of electronic aggression was 3.26 (p<0.01) of that for non-communicating pupils. The odds

248 were higher among those who communicated very often (OR=5.52, p<.05). The odds for

249 participants who were online one to two hours per day, during weekend and were engaged in

250 electronic aggression as victims were 2.60 (p<.05) compared to those who devoted to online

251 activities less than one hour per day. The odds were higher among the participants who used the

252 Internet between two and four hours per day during weekends (OR=3.23, p<0.01) and when the

253 screen time was more than four hours (OR=2.57, p<.05, respectively). Other variables did not

254 explain the engagement in electronic aggression as a victim (Table 4).

255 In the next ordinal regression model, it was determined that engagement in electronic aggression

256 as a perpetrator was explained by communicating with a person promoting violence and time

257 online during school days. The odds for participants who responded "occasionally" with reference

258 to communicating with a person promoting violence and were engaged in electronic aggression as

259 perpetrators were 4.07 (p<.01) compared to non-communicating participants. The odds were lower

260 and not significant among those reporting to communicate "frequently" with a person promoting

261 violence (OR=3.32, p>.05). An increase in Internet time (two to three hours per day during school

262 days and more than three hours vs less than two hours) were associated with higher odds of being

263 engaged in electronic aggression as a perpetrator (OR=3.05, p<.05 and 4.02, p<.05, respectively).

264 No significant odds increase, or decrease were found for other independent variables explaining

265 an engagement in electronic aggression as a perpetrator (Table 4).

266 **DISCUSSION**

267 Our results showed that the mean time spent on the Internet during school-free days was over twice

268 as long as during school days. Male students were online longer than female students both during

269 school days and school-free days. This tendency is consistent with previous study conducted

270 recently among Polish adolescents from mainstream schools [3]. It should also be noted that the

271 mean time dedicated to online activities increases with age among participants of the study group.

272 We could predict that it is connected with greater focus on learning activities or higher digital

273 competences among older students with VI.

274   Our study also confirmed that the Internet plays a very important role in knowledge development
275   among students with VI. Hence, access to e-resources is crucial for self-development and
276   independence during school time and in the adulthood among the members of this group. Half of
277   examined students used the Internet mainly for social networking or getting information to develop
278   school knowledge. Previous study revealed that using online chat has a positive impact on well-
279   being of people with VI but searching for disability-related information or participation in online
280   support groups influenced them negatively [32]. Another study showed that access to the Internet
281   provides people with disabilities with the possibility to communicate with friends, spend and enjoy
282   leisure time [33]. As explained by the compensation model, if someone is socially inactive off-
283   line, he or she benefits more from using the Internet [34].

284   Using music files and software without a license and viewing sites with sexual content were the
285   most common risky behaviors among our students with VI. These results are consistent with the
286   preliminary report which indicated the same tendency [30]. It should be noted that boys undertook
287   all risky behaviours more often than girls, including downloading the software illegally and
288   hacking. Moreover, the boys examined viewed sexual webpages more often than girls. This aspect
289   seems to be worth analysing in the context of adolescents with VI. As sexuality starts to play an
290   important role in puberty, it is natural that adolescents search for knowledge, also on the Internet,
291   and develop their own norms and attitudes towards sex [35]. At the same time, however, there
292   appears the risk of exposure to specific manifestations of violence, sexting, negative stereotypes,
293   or dehumanization [36]. From this point of view, adolescents with VI, who experience difficulties
294   in making intimate relationships in real life and try to compensate for it in the virtual world, can
295   be more exposed to sexual online violence. Still, it seems understandable that adolescents with VI
296   search for sex and sexuality-related information, especially that they have diminished possibilities
297   to acquire knowledge by observation or contact with peers, compared to young people without
298   sensory deficits, and when sex education at home or school is not enough or is not tailored for their
299   specific needs [37].

300   Regarding students with VI who experienced electronic aggression, the highest scores were
301   observed for witnessing electronic aggression and the lowest for acting as perpetrators. There are
302   no statistical differences between genders in this respect, but boys experienced being a witness, a
303   victim, or a perpetrator of electronic aggression more often than girls. Furthermore,
304   communication with a person promoting violence and the mean time of online activity are

305 significant predictors of the likelihood of being a witness, a victim, or a perpetrator of electronic
306 aggression.

307 Our study also showed that the more time students spend on the Internet during school-free days,
308 the more likely they are to become a witness or a victim. The risk of becoming a perpetrator of
309 electronic aggression depends on the online time during school days. It was also revealed that
310 students with VI having occasional online contact with a person promoting violence become three
311 times more often a witness or a victim, and four times more often a perpetrator of electronic
312 aggression. They are even five times more likely to become the victims of electronic aggression if
313 they come into contact with such a person often or very often, compared to those who have never
314 communicated with the perpetrator of aggression. The constant access of perpetrators to their
315 victims on Internet is the mechanism that makes electronic aggression even more destructive than
316 the traditional one [17]. Many young people, mostly because of using SNS, are "always
317 connected" and they are constantly exposed to harmful content and behaviours towards them. Even
318 if they decide to be offline, negative information about them could be further disseminated over
319 the Internet [17].

320

321 **CONCLUSION**

322 Cyberspace with its technological affordances has enabled new proximity dynamics in user-to-
323 user and user-to-content interactions, as argued by the MPA. Allowing users to transgress time
324 and space boundaries it has considerably extended possibilities of participation and agency. Hence,
325 safe use of the Internet enables and facilitates information exchange, supports the learning process,
326 provides an opportunity for self-expression and communication with people having similar
327 interests. However beneficial in educational terms and in the context of social participation, using
328 the Internet is burdened with the risk of exposure to various types of online aggression and
329 otherwise harmful content.

330 Considering the above factors, teaching digital competences and media literacy we should place
331 particular emphasis on constructive and safe media use among young people with VI. Safety-
332 related awareness-raising activities should address problems of cyberbulling, electronic
333 aggression, including "digital dating abuse" [38], as well as other online risk behaviours. Sexual
334 health education is also necessary to protect adolescents with VI against sexual violence and ensure
335 proper development within this sphere of psychosocial functioning [39]. Not only students, but

336 also parents, caregivers, teachers and health educators should be confronted with possible risks
337 associated with cyberspace and provided with knowledge about preventive resources, strategies
338 and tools adjusted to the special needs of people with disabilities [40]. Another important and
339 protective factor is developing social skills and enhancing interpersonal contacts in real life to
340 minimize the need to compensate for loneliness on the Internet.

341 **Limitations**

342 Our findings are not free from limitations. The first limitation is the cross-sectional design that
343 makes some causal reasoning impossible. Further, self-administrated form of examining was used
344 in order to enable anonymity. Respondents were supported by researchers and teachers were not
345 present during the process of filling in questionnaires, which should enhance honesty of the
346 answers provided. Our intention is to repeat the study among adolescents with VI attending regular
347 schools and take into consideration their parents' and teachers' opinions. Moreover, the results of
348 our research are difficult to compare with the results of other studies of children without or with
349 disabilities. This is due to the lack of validated diagnostic tools dedicated to people with different
350 disabilities. Our research is the starting point for the development of this direction in order to
351 ensure a high quality of life for people at risk of social exclusion.

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Ethics declaration

The project was approved by the Bioethics Committee of the Medical University of Lodz (No
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475

Table 1(on next page)

Types of Internet activity among young people with visual impairment including gender

Each data point activities faced by students with Visual impairment according to gender. A row data and percentages are involved in the table.

1   **Table 1. Types of Internet activity among young people with visual impairment including gender**
2
3

	Total			Boys			Girls		
	Never/ almost never	Sometimes	Always/ almost always	Never/ almost never	Sometimes	Always/ almost always	Never/ almost never	Sometimes	Always/ almost always
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Conversation via the Internet (chats, Skype)	125(26.9)	204(43.9)	136(29.2)	59(23.8)	117(47.2)	72(29.0)	66(30.4)	87(40.1)	64(29.5)
SNS	85(18.0)	136(28.9)	250(53.1)	55(22.1)	79(31.7)	115(46.2)	30(13.5)	57(25.7)	135(60.8)[1]
Discussion forums	288(61.5)	145(31.0)	35(7.5)	138(55.6)	84(33.9)	26(10.5)	150(68.2)	61(27.7)	9(4.1)[2]
MP3, music and software uploading	101(21.5)	198(42.0)	172(36.5)	55(22.1)	87(34.9)	107(43.0)	46(20.7)	111(50.0)	65(29.3)[3]
e-mails	179(38.2)	208(44.5)	81(17.3)	91(36.7)	109(44.0)	48(19.3)	88(40.0)	99(45.0)	33(15.0)
Searching for information for learning purpose	35(7.5)	210(44.9)	223(47.6)	18(7.3)	123(49.6)	107(43.1)	17(7.7)	87(39.6)	116(52.7)
Online shopping	303(64.3)	143(30.4)	25(5.3)	160(64.3)	73(29.3)	16(6.4)	143(64.4)	70(31.5)	9(4.1)
Blogs	344(73.2)	88(18.7)	38(8.1)	179(72.2)	50(20.2)	19(7.6)	165(74.3)	38(17.1)	19(8.6)

4   *[1] Chi²=11.00; p= 0.004; [2]Chi²=10.77; p=0.005; [3]Chi²=12.46; p=0.002*
5

Table 2(on next page)

Online risky behaviours and gender

Each data point activities faced by students with Visual impairment according to gender. A row data and percentages are involved in the table.

1 **Table 2. Online risky behaviours and gender**

Risky behaviours	Total			Boys			Girls		
	Never/ almost never	Sometimes	Always/ almost always	Never/ almost never	Sometimes	Always/ almost always	Never/ almost never	Sometimes	Always/ almost always
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Downloading the software illegally without valid license	310(77.2)	118(25.1)	43(9.1)	144(57.8)	66(26.5)	39(15.7)	166(74.8)	52(23.4)	4(1.8)[1]
Publication of photos and movies on YouTube without permission of their owners	433(90.8)	34(7.1)	10(2.1)	223(88.5)	22(8.7)	7(2.8)	210(93.3)	12(5.3)	3(1.3)
Hacking	417(87.4)	42(8.8)	18(3.8)	201(79.8)	34(13.5)	17(6.7)	216(96.0)	8(3.6)	1(0.4)[2]
Communication with persons promoting violence	433(90.6)	31(6.5)	14(2.9)	225(88.9)	17(6.7)	11(4.3)	208(92.5)	14(6.2)	3(1.3)
Publication information regarding sex	445(93.3)	18(3.8)	14(2.9)	227(90.1)	13(5.2)	12(4.7)	218(96.9)	5(2.2)	2(0.9)[3]
Viewing sexual pages online	409(85.6)	56(11.7)	13(2.7)	198(78.6)	41(16.3)	13(5.1)	211(93.4)	15(6.6)	0(0.0)[4]
Gambling online	440(92.4)	27(5.7)	9(1.9)	226(89.7)	17(6.7)	9(3.6)	214(95.5)	10(4.5)	0(0.0)[5]

2

3   *[1]$Chi^2=30.26$; p=0.000; [2]$Chi^2=29.42$; p=0.000; [3]$Chi^2=9.38$; p=0.009; [4]$Chi^2=24.14$; p=0.001; [5]$Chi^2=9.52$; p= 0.008*

4

Table 3(on next page)

The frequency of electronic aggression (witness, victim, perpetrator) in e-mails, or in social media

Each data point activities faced by students with Visual impairment according to gender. A row data and percentages are involved in the table.

1   **Table 3. The frequency of electronic aggression (witness, victim, perpetrator) in e-mails, or**
2   **in social media**
3

Behaviours	Boys			Girls		
	Never/ almost never	Sometimes	Always/ almost always	Never/ almost never	Sometimes	Always/ almost always
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Have you ever witnessed someone threatening or offending other people via the Internet?	119(49.4)	106(44.0)	16(6.6)	105(46.9)	111(49.5)	8(3.6)
Have you ever been threatened or offended by another person via the Internet?	196(77.2)	49(19.3)	9(3.5)	188(82.5)	37(16.2)	3(1.3)
Have you ever threatened or offended another person via the Internet?	220(86.6)	30(11.8)	4(1.6)	205(90.3)	21(9.3)	1(0.4)

4

Table 4(on next page)

Ordinal logistic regression models explaining electronic aggression (witness, victim, perpetrator) with multiple predictors

1 **Table 4. Ordinal logistic regression models explaining electronic aggression (witness,**

2 **victim, perpetrator) with multiple predictors**

Witness			
Communication with person promoting violence	**OR**	**95%CI**	**P**
Never/almost never	1.00	Ref.	
Sometimes	3.07	(1.29-7.32)	0.011
Always/almost always	1.97	(0.44-8.87)	0.374
Time of online activity during school-free days (in h)			
0	1.00	Ref.	
less 1	1.91	(0.78-4.66)	0.155
from 1 to 2	1.69	(0.70-4.08)	0.241
from 2 to 4	1.97	(0.81-4.79)	0.135
over 4	3.81	(1.44-10.1)	0.007
Victim			
Communication with person promoting violence			
Never/almost never	1.00	Ref.	
Sometimes	3.26	(1.40-7.60)	0.006
Always/almost always	5.52	(1.37-22.3)	0.016
Time of online activity during school-free days (in h)			
0	1.00	Ref.	
less 1	2.60	(1.23-5.51)	0.012
from 1 to 2	3.23	(1.50-6.98)	0.003
from 2 to 4	2.57	(1.07-6.13)	0.034
over 4			
Perpetrator			
Communication with person promoting violence			
Never/almost never	1.00	Ref.	
Sometimes	4.07	(1.61-10.3)	0.003
Always/almost always	3.32	(0.67-16.5)	0.142
Time of online activity during school days (in h)			
0	1.00	Ref.	
less 1	1.57	(0.57-4.29)	0.379
from 2 to 3	3.05	(1.07-8.710)	0.036
over 3	4.02	(1.23-13.1)	0.021

3