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Smartphone Addictive Behaviour in Adolescents

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Abstract

The aim of the contribution was to map the degree of smartphone addiction in adolescents by means of The Smartphone Addiction Scale (SAS-SV) short version designed by Kwon et al. (2013). The construct validity of the research tool was established by exploratory factor analysis. A unidimensional solution appeared suitable to work with. The internal consistency of the scale was determined by Cronbach's alpha (0.831). 519 respondents aged 12 to 25 years ($AM = 19.41$; $SD = 3.83$) participated in the research. A statistically significant difference was confirmed in the degree of adolescents' smartphone addiction by gender in favour of women, and by age, at which respondents got their first smartphones, in favour of those who got their smartphone at a younger age. The effect size of differences was weak. No statistically significant difference showed in the degree of smartphone addiction by school type attended by adolescents.

Key words: *mobile phone, addiction, youth, school*

Introduction

The generation of today's young people is called the Z Generation. According to Dolot (2018) it is the generation of those who are entering the work process or labour market, or are studying and not working yet. Singh and Dangmei (2016) state that they are young people raised with the social web, digital centric and technology is their identity. We share the opinion of the above authors, that it is a so-called "Virtual Generation".

According to Tari (2011) these young people are characterized by underdeveloped emotional intelligence, they live as if happier lives, but with less meaning and values, they are more narcissistic which shows also in leaving digital footprints; due to applications that support multitasking. Being precise, or being able to concentrate and memorize something in the long term has become more difficult for them; their thinking is predominantly visual, and creativity and imagination is only in the second place; many are suffering from chronic sleep deprivation because they do not want to miss anything.

The increasing use of mobile technologies means progressive digital colonization of children's lives, transforming interaction of younger actors with time, space, communication and cultural production. A number of risks associated with the use of the Internet is associated with the use of mobile phones since most of such devices allow access to the Internet.

These are types of Internet risks associated with the "Internet freedom" characterized by anonymity, absence of responsibility and almost impossible identification of the person legally responsible for the content and harmful effect of an Internet page. Here, we can talk about cyberbullying, cybergrooming, cyberstalking or sexting (Dulovics & Kamenská, 2017).

In 2008, the term "NOMOPHOBIA" was coined during a study with the objective to evaluate the possibility of anxiety disorders occurred due to overuse of mobile phones in the United Kingdom. It is used for a psychological condition when people have a fear of not being able to use their mobile phones. The study found that nearly 53% of British people using mobile phones were apprehensive when they lost their mobile phones, ran out of batteries or had no network coverage. That study also revealed that approximately 58% of men and 47% of women using mobile phones suffered from the mobile phone anxiety, and 9% felt strained when their mobile phones were switched off. 55% of the participants agreed that they were not able to maintain connectivity with their dear and near ones, which was the main reason for their phobia (Bhattacharya et al., 2019).

Excessive time spent on mobile phones affects also the level of our mood. Two hours spent on a mobile device do not give us a surge of energy and good mood, but rather a lack of interest in anything. In youth, it is obvious especially in the school setting where a media-induced aversion to school can be observed. Such unconcern is manifested not only in school performance, but also in involvement in various voluntary activities in the school setting (Spitzer, 2018).

The greatest risk of the mobile phone addiction is the use of social media and creation of profiles to get acquainted with new people, which the study by Gündoğmuş et al. (2020) showed. The survey by Chen et al. (2017), comprising 1441

students, showed a 29.8% prevalence of smartphone addiction among participants (30.3% in men and 29.3% in women). The use of game applications, anxiety and poor sleep quality were the factors associated with the smartphone addiction. Significant factors for female students were, inter alia, the use of social network services and depression. The study by Haug et al (2015) focused on identification of indicators of the smartphone use and smartphone addiction. It found out that the smartphone addiction was more frequent in younger adolescents (15–16 years old) in comparison with young adults (19 years old and older).

The survey by Luk et al (2018) showed that a statistically significant higher degree of smartphone addiction was found in women in comparison with men, younger population in comparison with older population and population with lower education in comparison with population with higher education. The survey by Tateno et al. (2019) also identified a higher degree of smartphone addiction in women. Women, as the survey showed further, used the Internet mainly for social networking via smartphone. Cheung et al. (2019) using a linear regression model pointed out to the fact that adolescent women who spent more time using smartphones on their holidays had on average higher scores in the smartphone addiction scale.

To acquire skills and abilities from digital media, a child first needs to know how to use them purposefully. Media education is an example of how school can act preventively in this area. Its goal is the development of media literacy and acquisition of media competences, i. e. the ability to receive, analyze, evaluate and communicate a wide scale of media contents. Preventive strategies developed in the school setting are influenced by the overall involvement of pupils, teachers and parents, their mutual cooperation and overall continuity of preventive strategies.

Methodology

The use of mobile phones is one of the hallmarks of our age. Due to the accelerating pace of life, mobile phones have become an integral part of everyday life. They are more accessible to the public than computers and the Internet. Mobile phones, just like other modern technologies, are a threat of potential addiction. In this respect, it is necessary to pay attention to the addressed issue at the theoretical as well as empirical level. The aim of our research was to determine and analyze the risk of mobile phone addiction in secondary school and university students due to their excessive use of mobile phones, and to identify factors contributing to the emergence of potential risks associated with the mobile phone addiction.

To measure the smartphone addiction, the short version of *The Smartphone Addiction Scale (SAS-SV)* by Kwon et al. (2013) was used. The research tool was designed to map the addiction of adolescents to smart mobile phones. It has 10 items to be answered by respondents on a 6-point scale (1 – I strongly disagree to 6 – I strongly agree). In order to understand the structure of the research tool, the exploratory factor analysis was used. The principal component method and promax rotation were applied, assuming the factors not to be independent of each other.

The KMO test of sampling adequacy (0.855) showed the factor analysis was suitable for obtained data and Bartlett's test of sphericity rejected the hypothesis that the correlation matrix was a unit matrix ($0.000 < 0.001$). It held that the component could not have a factor loading higher than 0.40 in two or more factors at the same time. The total exhausted variability of the variables after rotation could not be defined since the factors were correlated. It was of 53.78% before rotation.

On the basis of Kaiser's criterion (eigenvalue higher than 1) three factors could be considered. The scree plot, on the other hand, indicated the alternative to take only two factors into account, which was a more adequate solution. In the end, interpretation of generated latent variables appeared to be a problem. It was not possible to generalize unambiguously, what the items in the factors told about. Due to this and the fact that correlations of factor scores and the mean scores of factors were moderate ($r = 0.444$; $r_s = 0.517$), a unidimensional solution was decided for.

Internal consistency of the tool was evaluated by Cronbach's alpha (0.831).

Reflecting the analyzed studies, independent variables such as gender, age at which respondents got their first smartphones and type of school they attended (see T1) were worked with in the research. Convenience sampling of respondents was used, since we were limited by their willingness and motivation to participate in the research. Data were collected by means of online questionnaires as well as questionnaires in the traditional form in the case of secondary school students. 519 respondents participated in the research.

T1 Characteristics of the research sample

Independent variables	N	%	AM	SD
Gender				
Male	220	42.39		
Female	299	57.61		
Age				

Independent variables	N	%	AM	SD
12–15	90	17.34	19.41	3.83
16–20	178	34.30		
21–25/26	251	48.36		
Age of getting the first smartphone				
6–10	270	52.02		
11–15	249	47.98		
Type of school				
Eight-year grammar school (or conservatory)	87	16.76	30.25	
Secondary schools	157	30.25		
University	275	52.99		

The following hypotheses were set:

- H1: It is assumed that there is a statistically significant difference in the degree of adolescents' smartphone addiction by gender in favour of women.
- H2: It is assumed that there is a statistically significant difference in the degree of adolescents' smartphone addiction by age at which they got their first smartphones in favour of those who got smartphones at a younger age.
- H3: It is assumed that there is a statistically significant difference in the degree of adolescents' smartphone addiction by type of school attended in favour of secondary school students.

To identify statistically significant differences and relationships between variables, non-parametric tests were used - the Mann-Whitney U-test, Kruskal-Wallis test, Friedman test and Spearman's correlation coefficient, since the variable did not show normal distribution of the data set and each sub-set, which was verified by the Kolmogorov-Smirnov test ($p \leq 0.05$). To determine the practical significance of differences, eta squared was used (η^2). Of the descriptive statistics, the arithmetic mean (AM), standard deviation (SD), median (Me), minimum (Min) and maximum (Max) value of measurement were used. The data were analyzed using the program SPSS 20.0.

Results of research

It is evident from T2 that there is a statistically significant difference ($0.000 \leq 0.05$) in the degree of smartphone addiction by gender. Female respondents

reached higher scores (AM = 2.95; Me = 2.90) than male respondents (AM = 2.68; Me = 2.70) in the smartphone addiction scale. However, only a small effect of the differences in the resulting values was noted.

T2 Degree of smartphone addiction by independent variables

Gender	Smartphone addiction						Mann-Whitney U test	p-value	η^2
	N	AM	SD	Me	Min	Max			
Male	220	2.68	0.83	2.70	1.00	5.60	26824.000	0.000*	0.025
Female	299	2.95	0.87	2.90	1.00	5.60			
Range of years	Smartphone addiction						Mann-Whitney U test	p-value	η^2
	N	AM	SD	Me	Min	Max			
6–10	270	2.94	0.86	2.95	1.10	5.60	28587.500	0.003*	0.017
11–15	249	2.72	0.86	2.70	1.00	5.20			
Type of school	Smartphone addiction						Kruskal-Wallis test	p-value	η^2
	N	AM	SD	Me	Min	Max			
G S+ C	87	2.92	0.73	3.00	1.10	4.50	4.733	0.094	
SS	157	2.91	0.90	2.90	1.00	4.90			-
University	275	2.76	0.88	2.80	1.00	5.60			

Legend for values: 1 – I strongly disagree, 2 – I disagree, 3 – I weakly disagree, 4 – I weakly agree, 5 – I agree, 6 – I strongly agree

Legend for abbreviations: GS + C – eight-year grammar school and conservatory, SS – secondary school (secondary vocational schools and grammar schools)

T2 also shows that there is a statistically significant difference ($0.003 \leq 0.05$) in the degree of smartphone addiction by age at which adolescents got their first smartphones. Respondents who got smartphones at a younger age had higher scores (AM=2.94; Me=2.95) in the smartphone addiction scale in comparison with respondents who got smartphones at an older age (AM=2.72; Me=2.70). Similarly as above, a small effect was noted of the differences in the resulting values.

On the basis of the data presented in T2, it can also be stated that there is no statistically significant difference in the degree of smartphone addiction by type of school attended by adolescents. Considering different types of schools, respondents scored similarly in the smartphone addiction scale.

Discussion

The aim of our study was to identify the degree of addiction to a smart mobile phone in adolescents. It is a type of addiction, which, as indicated by researches, has an impact on the physical and mental health of adolescents (students).

Mescolloto et al. (2019) found a high prevalence of smartphone addiction among students in Brazil. Participants of their survey spent almost 5 hours a day on the smartphones, which is 21% of the day. A study by Fallahtafi et al. (2020), of a sample of 398 adolescents aged 12 to 18 years, brought an interesting finding demonstrating a strong positive correlation between the smartphone addiction and Internet addiction. Thomée (2012), in a study with 1127 people aged 19 to 25 years, reported that intensive ICT use could have an impact on the mental health in young adults. A frequent use of mobile phones was a potential risk factor of sleep disorders in men and depression in both genders. Unlimited connection to the Internet via mobile phone may be a problem also in respect of potential socio-pathological behaviours such as cyberbullying and various forms of aggressive behaviour. In their study, Çankaya et al. (2011) were dealing with the influence of distrust among university students, considering also the Internet addiction. Their survey showed that when cyberbullying was mediated by the Internet addiction, its impact on distrust levels was more significant. The correlation between the Internet addiction and aggressive behaviours was presented also in a study by Borowska (2009) who found no direct relationship between the degree of Internet addiction and aggressive behaviour in secondary school students (in difference to younger pupils).

What the smartphone addiction is conditioned by remains a question. It is apparent that at present, when we are forced to deal with many things online via the Internet, using smartphones cannot be avoided. When confronted with a problem, frequently, more effective communication via mobile applications is used.

The research showed that young adults who reported more time on smartphones chatting or taking photos/videos, had higher scores in the smartphone addiction scale. Although the positive correlations were not high ($r_s = 0.377$, $r_s = 0.253$), they were more noticeable in comparison with correlations between frequencies of other activities performed on smartphones (making calls, sending SMS and MMS, listening to music, etc.) and the smartphone addiction (no or trivial positive correlations were observed in the latter cases).

The research showed a statistically significant difference in respondents' scores in the frequency of selected smartphone activities ($p = 0.000$; Friedman test = 1752.459). Most frequently, adolescents used smartphones for chatting and

making calls (AM=4.71; Me=5.00; AM=3.59; Me=4.00). In their survey made at a medical university, Ammati et al. (2018) revealed that up to 46% of students used smartphones 4 to 6 hours a day with social networking the centre of their attention.

The frequency of such activities explains also confirmation of our first two hypotheses. Female respondents scored statistically significantly higher in the items reading books ($p = 0.006$; Mann-Whitney U test = 28752.500; AM = 1.83/1.53; Me = 1.00/1.00) and taking photos/videos ($p = 0.004$; Mann-Whitney U test = 28276.000; AM = 3.16/2.87; Me = 3.00/3.00) by means of smartphone. While male respondents scored statistically significantly higher in the items listening to music ($p = 0.003$; Mann-Whitney U test = 28068.000; AM = 3.69/3.33; Me = 4.00/4.00) and playing games ($p = 0.000$; Mann-Whitney U test = 23915.000; AM = 2.74/2.05; Me=2.32/2.00) on the smartphone. The mean values given for the respective activities were based on the scale never, once a week, several times a day, once an hour, several times an hour.

In the end, considering the total mean score achieved by respondents for the whole research tool (AM = 2.83; Me = 2.80) it would not be objective to speak about a smartphone addiction. It would be more appropriate to refer only to a risk of smartphone addiction (the total mean score fits the scale alternative 3, which means I weakly disagree).

The smartphone addiction risk can be reduced also by involvement of school limiting the use of smartphones to education needs. It can be inspired by the Decree No. 320/2008 Coll. of the Ministry of Education, Science, Research and Sport of the Slovak Republic on elementary schools (§20, section 7), according to which a pupil is not allowed to use a mobile phone during classes. Schools can apply this limitation in various ways, implementing it by means of school rules. Pupils and students observe the school ban either strictly during their whole stay at school, or partially, when allowed mobiles during breaks and dinners, or, as the case may be, when allowed by the teacher e. g. when the mobile phone is used as a didactic aid (this could relate also to teaching at universities).

Since smartphones are a part of young people's everyday lives, school preventive and educational activities should be strengthened by professional staff (e. g. social pedagogue) who would help teachers to tackle problems associated with the overuse of smartphones by secondary school students (informing about risks and potential limitation of the use of smart mobile phones at school).

Our research has, of course, limitations. It would be useful to investigate also other specifics of the target group, such as peer relationships, with the scale. Another limitation is that the research took place only in one Slovak region.

The research results present a certain basis for drawing up measures relating to risks of the mobile phone use, they are a precondition for proposals of activities preventing and eliminating risks associated with the mobile phone addiction, and they open up possibilities for managing factors influencing the emergence of students' risk behaviour. Our research indicates the need for increased prevention of online risk behaviour in the school setting, and its results will serve as theoretical starting points of the project VEGA No. 1/0396/20 "Influence of electronic media on the behaviour and development of cross-cutting capabilities in the Z generation".

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