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Early Adolescents' Digital Gameplay Preferences, Habits and Addiction

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Abstract

The paper provides an empirically grounded innovative and unique insight into relations between digital gameplay preferences, habits and addiction. The research sample consisted of 1262 eleven-to-fifteen-year-old students from 22 Serbian schools. An adequate psychometric instrument was developed and evaluated as part of the research. The influence of socio-demographic factors on digital gameplay preferences, habits and addiction was analyzed. Research hypotheses have been proposed in accordance with research objectives. They have been confirmed since the obtained results support the existence of the relation between digital gameplay and addiction among early adolescents.

Key words: *digital games; early adolescents; gameplay addiction.*

Introduction

The constant increase of the popularity of digital games in the last three decades eclipsed other forms of entertainment, such as movies, television or music, especially among the youth. The dramatic development of digital gaming industry and the increase in the number of regular players focused the attention of many researchers on examining the short- and long-term effects of playing digital games. Early adolescents are often confronted with sophisticated digital worlds and visual culture. Digital gameplay experience is focused on situational awareness, learning through mistakes and the development of personal identity by problem solving. Flexible digital virtual worlds demand players' active involvement. While playing digital games, students often unconsciously acquire specific/presented attitudes and knowledge.

In spite of the initial negative connotation of playing digital games (Anderson & Bushman, 2001; Anderson & Dill, 2000; Griffiths & Davies, 2005; Irmak & Erdogan,

2015; Ogletree & Drake, 2007), researchers intensified their interests in the examination of positive effects. About a decade ago, Squire (2006) emphasized that many researchers unduly ignore digital games, even though they present a powerful medium with great educational potential. Digital gameplay can enhance learning by activating one's intelligence and developing willingness to collaborate in order to solve problems, while intensifying player empathy with the help of the virtual world through connecting emotions and cognition which provide a feeling of productivity and authority.

Researchers stated that about 40% of French population play digital games (Fortin, Mora, & Trémel, 2006). Analysis of the French youth population structure showed that 91% of children and young adolescents (aged 6-14) and 95% of adolescents and young adults (aged 15-24) played digital games regularly. In addition, the examination of digital gameplay preferences of USA population showed that 97% of children and 53% of grown-ups played video games (Barab, Gresalfi, & Ingram-Goble, 2010). This great educational potential is not an easy exploit, as it requires determining useful and meaningful academic situations which would enable students to adopt goals, have legitimate roles and develop correlations with specific disciplinary contexts. Digital games have the potential to free the students of assessment stigma and to support their desire for innovation and challenge as natural parts of the learning process. Schwartz et al. (2010) suggested that specific gameplay options could be translated into student (player) knowledge/skill assessments, thus informing the teacher (evaluator) about the level of understanding problems and adopted problem-solving strategies. Experienced (successful) players had to acquire higher problem-solving knowledge and skills than the novice players in order to successfully achieve the next levels. Winning the game implies that the player has learned something in that process, as certain amount of time (often significantly great) had to be invested in practicing his/her abilities.

The basic research question is related to the examination of relations between digital gameplay preferences, habits and addiction. In order to conduct an empirical research a presumption was made that early adolescents (students) have had ample opportunities to play digital games (which is almost certain in modern society), and that they independently create their digital gameplay preferences and habits. According to the Uses and Gratifications theory (Katz, Blumler, & Gurevitch, 1973), individual psychological characteristics induce the needs that lead towards constructing behavioral patterns, creating preferences and selecting the media in order to fulfill them.

Related Work

Kafai (2006) explored the application of instructional games, whose content, graphical representation and instruction were conceived by game designers, and concluded that in fact, during the process of developing ideas and knowledge transfer strategies they benefited the most from them. In that case, the constructivist approach is related to digital/technological literacy as the valid implementation prerequisite.

Clark, Tanner-Smith, and Killingsworth (2016) stated that students gained higher cognitive competence and intellectual openness while playing digital games, but that most of the research related to this topic is unfortunately limited to evaluating whether games are good or bad for education, not focusing on the analysis of the structure, purpose or other potential applications.

In his meta-analysis, Ferguson (2007) examined positive and negative effects of playing digital games, and concluded that gameplay is connected to enhancing visual-spatial abilities. However, the question why digital gameplay generated these effects was left unanswered. Furthermore, playing digital games could raise self-esteem, improve visual attention skills, increase empathy and social sensitivity (Gentile, Swing, Lim, & Khoo, 2012). In addition, playing kinesthetically active digital games by using motion sensors (e.g., Nintendo Wii Fit, Microsoft Kinect) increases motivation to exercise and leads to enhancing physical condition (Graf, Pratt, Hester, & Short, 2009). Olson (2010) identified three basic motivation elements: socialization, friendship and the opportunity to lead other players or to learn from them. Winning a game creates a sense of achievement and pride.

Adolescent population have shown an extreme increase of interest in playing digital games in the last several decades, so digital games can today be considered as the central part of youth culture. The limited and controlled gameplay presented itself as a very useful tool for emotional relief and relaxation (Prot, Anderson, Gentile, Brown, & Swing, 2014). However, the lack of control can easily lead towards the development of digital gameplay addiction, as concluded by several researchers (Desai, Krishnan-Sarin, Cavallo, & Potenza, 2010; Lin, Ko, & Wu, 2011; Poli & Agrimi, 2011), who stated that in extreme cases almost 15% of adolescent population developed digital games addiction to some extent.

A review of literature also points to the fact that researchers are united on the stance that digital games have become a valid educational tool, but that there is a relatively small number of empirical studies on relations between early adolescent digital game addiction and gameplay preferences and habits, which highlights the importance of this research.

Digital Gameplay Addiction

Contemporary researchers (Griffiths & Davies, 2005; Parker, Summerfeldt, Taylor, Kloosterman, & Keefer, 2013) focused on the development of digital gameplay addiction as a consequence of long-term and uncontrolled playing. Digital gameplay addiction and pathological gambling are often perceived as similar problems. The cognitive exposure, tolerance and euphoria are common criteria related to a player's involvement in game. In order to consider the involvement as addiction, the presence of conflict, withdrawal symptoms, relapse and salience are required identifications (Wood, 2007). The main difference between regular players and addicts is in their loss of control.

The digital gameplay addiction is defined as profusely compulsive use of digital games that may result in social and/or emotional problems (Lemmens, Valkenburg, & Peter, 2009). Tejeiro Salguero and Morán (2002) defined several criteria for the identification of digital gameplay addiction in adolescents:

- Increase of the time spent on thinking, planning and remembering gameplay;
- Indisposition and irritation by the inability to play;
- Increase of the gameplay time in difficult moments as a way of escaping reality;
- The inability to control the time spent playing and hiding it from parents and friends;
- Skipping meals, shortening of time spent sleeping and not performing the agreed tasks in order to have more time to play.

Griffiths and Davies (2005) defined digital games addiction through seven indicators:

- Salience – playing games becomes an important part of life, it occupies a person's thoughts, feelings and influences their behavior. Players ignore their obligations and social activities, and focus exclusively on playing games. As the addiction progresses, the lack of interest in social interaction and relationships increases.
- Tolerance – players gradually increase gameplay time, which is in direct correlation with the development of digital games addiction (Van Rooij, Schoenmakers, Vermulst, Van den Eijnden, & Van de Mheen, 2010). However, this factor cannot be observed independently, as individuals demonstrate various symptoms.
- Withdrawal – the unpleasant feeling or physical effect that appears when the activity is suddenly interrupted or irregularly realized. In digital game addicts, it is manifested by anger and violent thoughts towards anyone who obstructs playing.
- Mood modification – is related to the subjective feelings during gameplay (excitement, comeliness etc.). Players often replace real life problems with the sense of enjoyment during gaming. Intensification of the problem is in direct correlation with the frequency and duration of playing digital games.
- Relapse – a gamer is unsuccessfully trying to control playing digital games. Combined with salience, it often leads to extreme addiction. For example, adolescents frequently react aggressively and in anger when their parents try to limit the gameplay time.
- Conflict – is reflected through lying, cheating or verbal/physical aggression. Conflicts can be internal (personal) or external (with others). Players can ignore hygiene, eating and/or sleeping in order to increase the duration of gameplay.
- Problems – digital game addiction can lead to low school performance, breaking up with the emotional partner and a lack of personal hygiene.

Higher level of depression is often identified in digital game addicts (Yen, Ko, Yen, Wu, & Yang, 2007), while Mehroof and Griffiths (2010) stated that the development of digital game addiction is in direct correlation with anxiety. Family should have the

key role in preventing addiction. Development of addiction in adolescent population is more frequent in families with disturbed/inadequate/bad internal relations (Feng, Yan, Guo, Wang, Li, & An, 2003). Jang, Hwang, and Choi (2008) stated that digital game addiction is clearly culturally dependent.

Digital Gameplay Addiction Scale

In order to identify digital games addiction, researchers have developed various assessment instruments that are often based on the adapted pathological gambling assessment instruments (Grüsser, Thalemann, & Griffiths, 2007; Lemmens et al., 2009). Lemmens et al. (2009) created two versions of gaming addiction scale for adolescents: a full 21-item and a short seven-item scale. Responses to items are in the form of a five-point Likert scale. The initial psychometric evaluation of the short version of the scale was performed on two samples of students (N_1=352 and N_2=369), aged 12-18. The resulting reliability coefficients presented satisfactory internal consistency of the scale (α_1=.86 and α_2=.81). The exploratory factor analysis identified single-factor structure, while the results of the confirmatory factor analysis corroborated good structural fit ($\chi^2_{(28)=}$69.90; p<.001; CFI=.97; RMSEA=.05 [90% CI (.03-.06)]).

Lemmens et al. (2009) stated that digital games addiction correlated with the following psycho-social characteristics:

- Length of the time spent playing (r=.58; p<.001) – is considered an insufficient addiction indicator, although problematic players spend more time playing games (Parker et al., 2013);
- Life satisfaction (r=-.29; p<.001) – expected negative correlation was confirmed, as adolescents find the escape from real-life problems in intensifying playing games (Ko et al., 2005);
- Loneliness (r=.31; p<.001) – is considered as the most significant predictor of the addiction development (Seay & Kraut, 2007);
- Social competence (r=-.18; p<.001) – researchers (Caplan, 2002; Lo et al., 2005) concluded that intensive gameplay is negatively correlated to socialization;
- Aggression (r=.26; p<.001) – Hauge and Gentile (2003) stated that there is a direct link between digital games addiction and aggressive behavior.

Game addiction scale was translated into several languages (Baysak, Kaya, Dalgar, & Candansayar, 2016; Gaetan, Bonnet, Brejard, & Cury, 2014; Heon, Sun, Jung, & Choi, 2009; Irmak & Erdogan, 2014; Lemos, Cardoso, & Sougey, 2016), and has been confirmed as psychometrically valid instrument. Based on these findings, the Serbian version of digital gameplay addiction scale for early adolescents (S-GAS) was translated and adapted from the original short seven-item version of the Game addiction scale for adolescents (Lemmens et al., 2009). The answers are in the form of a five-point Likert scale graded from 1 (never) to 5 (almost always) with the additional answer (I do not know). In order to ensure the validity, a translation and back-translation technique was used, for which two professional translators were engaged.

Research Methodology

Digital games are a part of everyday life among the majority of early adolescent population and their influence on cognitive, psychomotor and affective development must not be overlooked, which makes the research on gameplay preferences and habits not only topical but also necessary.

The research problem is how early adolescent digital gameplay preferences and habits are related to the development of digital game addiction. By limiting the sample to the population of early adolescents (aged 11-15), the analysis of individual differences and its influence on digital gameplay was enabled.

The aim of the research is to analyze relations between socio-demographic factors, digital gameplay preferences and habits, and the development of gaming addiction.

Four research goals were defined:

1. To explore the psychometric characteristics of the S-GAS instrument used to identify digital gaming addiction.
2. To examine the significance of gameplay preferences and habits on the development of digital games addiction.
3. To examine if there are gameplay differences between students from urban and rural environments.
4. To establish if early adolescent gender influences digital gameplay and the development of digital games addiction.

In accordance with the defined aim and goals, four research hypotheses were formulated and are further explained.

H_1: S-GAS is a valid psychometric instrument.

Rationale: The expected validity of translated and adapted short seven-item version of Game addiction scale for adolescents (Lemmens et al., 2009) is based on the results of referent research (Baysak et al., 2016; Gaetan et al., 2014; Heon et al,, 2009; Irmak & Erdogan, 2014; Lemos et al., 2016).

H_2: The identified digital gameplay addiction is related to early adolescent gameplay preferences and habits.

Rationale: The expectation is based on referent research results (Chory & Goodboy, 2011; Müller et al., 2014) which confirmed that players addicted to action games demonstrated the highest levels of extroversion, communication and spontaneous reaction in communication with other players.

H_3: There are no statistically significant differences in playing digital games between students from urban and rural environments.

Rationale: The expectation is based on the research conducted with the sample of 373 Dutch students aged 12 to 16, whose results showed no statistically significant differences in gameplay times and preferred digital games genre between early adolescents in urban and rural environments (Simons, de Vet, Brug, Seidell, & Chinapaw, 2014).

H4: Early adolescent males are more inclined to the development of digital games addiction.

Rationale: Frölich, Lehmkuhl, Orawa, Bromba, Wolf, and Görtz-Dorten (2016) presented the results of clinical research on digital games addiction of adolescents and concluded that about 90% of identified addicts were males. This finding is also in accordance with the results of previous analogue research (Ko, Yen, Chen, Chen, & Yen, 2005).

In accordance with the formulated hypotheses, the following research variables were defined and explained:

- Time spent playing digital games – variable was operationalized by the questionnaire on digital gameplay habits and preferences. Students were questioned about the period when they play digital games, how often and how long, on which devices and whether they play games online;
- Preferred digital game genre – defined on the basis of the eight-dimensional digital game categorization (Aleksić, Ivanović, Budimac, & Popescu, 2016): Arcade (Action/Shooter/Platform), Adventure, Sports (Fighting), Simulation (Driving/Flight), Strategy, Logic (Puzzle), Online (Social) and RPG;
- Digital game addiction indicator – identified by seven criteria: Salience, Tolerance, Withdrawal, Mood modification, Relapse, Conflict, and Problems – operationalized by the S-GAS;
- Gender – male/female two-category variable;
- Age – five-category variable (11; 12; 13; 14; 15);
- Environment – urban/rural two-category variable.

A total of 1262 students 11 to 15 years of age participated in the research which was realized in 2015 in 22 Serbian schools of which 14 were located in urban areas (N=723; 60.4% students) and eight were in rural areas (N=539; 39.6% students). The selection of the participants was made with the goal to evenly represent various geographic, economic and socio-cultural environments. Before the research, the schools gave informed consent to research participation. Students completed the pen-and-paper form of questionnaire anonymously and voluntarily in the school facilities in about 30 minutes.

The first part of the questionnaire (demographic characteristics) was used to gather the basic information about the participants, while the second part (digital games preferences and habits) was focused on students' digital gameplay and consisted of 14 multiple-choice questions (each with six possible answers). The students were questioned about how often and how long they play digital games, on which devices, whether they play with others and/or online, and which digital game genre they prefer. In order to make a valid assessment of the average weekly time that early adolescents spend playing digital games, data about which days of the week and

during what part of the day students usually play digital games were collected. This method is considered far more precise than the simple self-assessment of the average daily time students spent playing games, because it is more efficient in activating autobiographical memory (Schwarz & Sudman, 2012). Digital game addiction was identified by the seven-item S-GAS that was distributed in the second part of the questionnaire.

In total, *N*=98 (7.8%) questionnaires were disregarded as incomplete or incorrectly filled, so the valid sample of *N*=1164 students consisted of *N*=598 (51.4%) male and *N*=566 (48.6%) female early adolescents. The average age of the participants was *M*=13.0 (*SD*=1.32) years.

In accordance with the theoretical-empirical nature of the research, and with the goal to test the defined hypotheses, the participants were examined by descriptive-analytical non-experimental method, based on which the distribution of properties and relationships among variables were established. The statistical data analysis was performed by IBM SPSS Statistics v22 software package. The following methods were used: descriptive statistics (frequency, percentage, arithmetic mean (M), standard deviation (*SD*), minimum, maximum, skewness, kurtosis), Kolmogorov-Smirnov test of distributions, correlation analysis, χ^2 test, independent samples t-test, Cronbach's alpha internal consistency coefficient, Kaiser-Meyer-Olkin (KMO) measure of sample adequacy, Bartlett's test, factor analysis (EFA and CFA), analysis of variance (ANOVA) and regression analysis.

Results

Psychometric Evaluation of the S-GAS

In order to perform the psychometric evaluation of the translated/adapted game addiction scale, its items were analyzed, descriptive statistic results were presented, a factor analysis was performed, and the internal consistency was measured.

The monothetic approach to the interpretation of results presumes that the addiction is identified by the S-GAS only if each criteria is met in order to avoid overestimating the frequency (Charlton & Danforth, 2007). It is perceived that the criteria are met if the value of the answer for each item is greater than or equal to 3. This approach creates a valid distinction between usual behavior and addiction.

Descriptive Statistics

The quality of the scale design was rated by analyzing the structure of the answers. The distribution of valid 8148 possible answers (seven items in 1164 questionnaires) was as follows: 1697 (20.8%) answers 1; 885 (10.9%) answers 2; 2534 (31.1%) answers 3; 1558 (19.1%) answers 4; 1014 (12.4%) answers 5 and 460 (5.6%) answers 6 – do not know. Based on the satisfactory even distribution of the results, it can be concluded that the scale is well designed. Descriptive indicators as well as the indicators of the distribution normality for each item of the scale are presented in Table 1.

Table 1
Item analysis of the S-GAS

Item		M	SD	SK	KU	KST
1	Is the time you spend playing games increasing?	3.21	1.17	-0.15	-0.84	0.18
2	Do you think every day about playing games?	2.76	1.04	-0.27	-0.40	0.29
3	Do you neglect school or sports in order to play games?	2.79	1.39	0.07	-1.14	0.20
4	Do you feel bad when you are not able to play games?	3.40	1.16	-0.52	-0.49	0.23
5	Do you play video games in order to forget the world around you?	3.23	1.22	-0.34	-0.55	0.22
6	Do your parents try to shorten your gameplay time?	3.05	1.54	-0.11	-1.45	0.18
7	Do you argue with your parents or friends about the time you spend playing games?	2.50	1.26	0.25	-0.95	0.21

M=arithmetic mean, *SD*=standard deviation, SK=skewness, KU=kurtosis, KST=Kolmogorov-Smirnov test (all values significant $p<.001$), the value of standard error for SK is 0.07 and for KU is 0.15

The differences between scores according to gender were examined by using t-test analysis. The results point that there were statistically significant differences according to gender on the following criteria: Salience ($t_{(1156)=}$-3.46; p=.001; d=0.20), Mood modification ($t_{(1113)}$ =10.4; p .001; d=0.62), Relapse ($t_{(1102)}$=11.4; p<.001; d=0.69) and Conflict ($t_{(1119)}$ =6.94; p<.001; d=0.41). No statistically significant differences by gender were recorded for the following criteria: Tolerance ($t_{(1047)}$ =9.77; p<.001; d=0.60), Problems ($t_{(1110)}$ =2.45; p=.015; d=0.15) and Withdrawal ($t_{(1158)}$ =1.80; p=.072; d=0.11).

Early adolescent females achieved higher scores (M=2.84; SD=1.00) for the Salience criteria than males did (M=2.63; SD=1.10). The t value was positive for each addiction criteria except Salience, which confirmed the presumption that early adolescent males are more likely to develop digital games addiction.

Boys achieved the highest scores in Tolerance (M=3.50; SD=1.13), and the lowest in Salience criteria (M=2.63; SD=1.10). Girls achieved highest scores in Withdrawal criteria (M=3.25; SD=1.24), and lowest in Conflict (M=2.18; SD=1.15).

Based on the t-test result analysis it can be concluded that S-GAS demonstrated the ability to identify performance differences between genders, and that males achieved the highest scores.

Factor Analysis and Reliability

The factor analysis validity was first tested by Kaiser-Meyer-Olkin (KMO) measure of sample adequacy and by Bartlett's test. As the value of KMO index was satisfactory (0.785) and the Bartlett's test result ($\chi^2_{(21)}$=1102.9; p<.001) was statistically significant, it was confirmed that the factor analysis of S-GAS structure can be performed and that the sample is adequate.

The exploratory factor analysis was performed by maximum likelihood method with orthogonal varimax rotation. The single factor solution had satisfactory value

(1.79) and explained 25.6% of the answer variance. The result was further tested by confirmatory factor analysis using the maximum likelihood method. Resulting values of the fit indicator ($\chi^2_{(11)}$=15.49; p<.001; χ^2/df=1.41; RMSEA=.019 [90% CI (.000-.039)]; SRMR=.016; CFI=.996; GFI=.996) were satisfactory, which is in compliance with the presumed model. The result implies that S-GAS demonstrated good psychometric properties, as expected based on the original research by Lemmens et al. (2009).

The Cronbach's alpha reliability coefficient value was α=.71 and the values of corrected item-total correlation were in the satisfactory range (0.16 – 0.52). The average score in S-GAS was M=2.99 (SD=0.64).

Digital Gameplay Preferences and Habits

A total of N=140 (13.4%) early adolescents reported not playing digital games. The average weekly gameplay time of N=904 (86.6%) students who did report playing digital games was 13.4 hours (SD=13.6). The answer range was from 0 to 42 hours. Students spent on average 148.5 minutes per day (SD=107.7) playing digital games. The largest group of N=156 (14.9%) students played digital games for 60 minutes daily. The overview of the percentage of average daily gameplay time is presented in Figure 1.

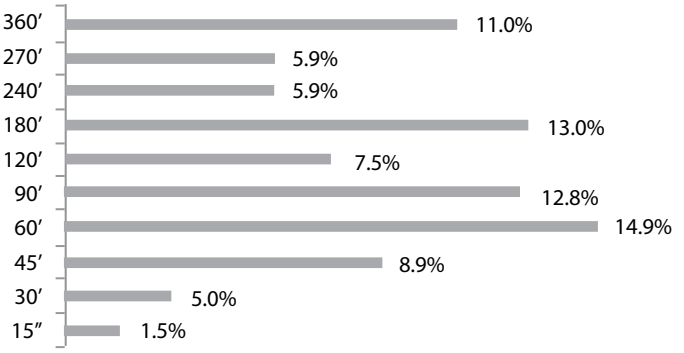

Figure 1. The distribution of average daily gameplay time

The average weekly gameplay time is a statistically significant predictor of preferred digital game genre ($\chi^2_{(8)}$=87.1; p<.001). The increase of weekly gameplay time by one hour significantly reduces the probability of preferring Logic games by 5.8% (p<.001) and increases the probabilities of preferring Action games by 2.7% (p=.049) and RPGs by 3.2% (p=.042).

Type of the environment that early adolescents live in was not a statistically significant predictor ($\chi^2_{(8)}$=13.3; p=.102) of preferred digital game genre.

Student gender was found to be a significant predictor ($\chi^2_{(8)}$=388.3; p<.001) of preferred digital game genre. Female early adolescents were significantly less likely to prefer Action games by 96.4% (p<.001), Adventures by 66.5% (p=.002), Sports by 94.1% (p<.001), Simulations by 83.5% (p<.001) and RPGs by 97.3% (p<.001).

Early adolescents' age was not a statistically significant predictor of preferred digital game genre ($\chi^2_{(32)}$=36.9; p=.252).

Digital Games Addiction

From the sample of 904 early adolescents who played digital games, the analysis of S-GAS results identified 112 (12.4%) students as addicted to digital games. As can be observed in Table 2, there were statistically significant differences in the length of the period that early adolescents played digital games and preferred playing games socially.

Table 2

The differences between digital game addicts and non-addicts

	Addicted		Not addicted				
	M	SD	M	SD	t	Sig.	d
Average daily gameplay time [minutes]	189.8	110.9	142.7	106.0	-4.37	.497	-
Average weekly gameplay time [hours]	19.4	14.3	12.9	13.3	-4.52	.089	-
Length of the period playing digital games [years]	3.4	0.3	2.1	0.4	-4.54	.002*	0.41
Playing digital games online	3.5	1.2	2.9	1.3	-5.32	.190	-
Playing digital games socially	3.8	0.8	3.0	1.3	-6.26	.000*	0.72

M=arithmetic mean, SD=standard deviation, t=student's independent samples t-test, Sig.=statistical significance, d=Cohen's effect size, *p<.05

Early adolescents who were identified as digital gameplay addicts mostly (N=42; 37.5%) played digital games without regard to the part of the day, while the students who were not addicted mostly played digital games only at the weekends (N=227; 28.2%).

Early adolescents addicted to digital games most often played games on their home computer/laptop (N=64; 57.1%) and mobile phones (N=31; 27.7%), similar to non-addicted students who also mainly played games on their home computer/laptop (N=434; 48.8%) and mobile phones (N=322; 36.2%).

There were no early adolescent addicts who do not prefer playing games socially. Preferred online and social gameplay is significantly correlated ($r_{s\ (897)}$=.22; p<.001).

Digital game addiction is a significant predictor ($\chi^2_{(8)}$=24.0; p=.002) of preferred digital game genre. Early adolescents who were not identified as addicts had significantly less probability of preferring Action games by 80.8% (p=.008), Sports by 74.8% (p=.030), Online/social games by 73.6% (p=.041), Strategies by 78.9% (p=.024) and RPGs by 79.0% (p=.026).

Socio-Demographic Factors

Environment

In total, 496 (54.9%) of early adolescents who play digital games lived in urban areas, while 408 (45.1%) of them lived in rural. There were no statistically significant differences in any of the observed variables, as presented in Table 3.

Table 3

The differences between early adolescents by the type of living environment

	Urban		Rural				
	M	SD	M	SD	t	Sig.	d
Average daily gameplay time [minutes]	147.6	106.8	149.6	108.8	-2.71	.495	-
Average weekly gameplay time [hours]	13.1	13.4	13.8	13.9	-0.81	.119	-
Length of the period playing digital games [years]	2.4	0.4	2.0	0.4	1.06	.442	-
Playing digital games online	2.9	1.3	3.0	1.3	-1.30	.791	-
Playing digital games socially	3.1	1.3	3.2	1.2	-0.96	.057	-

M=arithmetic mean, SD=standard deviation, t=student's independent samples t-test, Sig.=statistical significance, d=Cohen's effect size, *p<.05

Early adolescents who live in urban areas most often played digital games only at the weekends (*N*=142; 28.1%), while students in rural areas most often played games regardless of the time of the day (*N*=117; 28.5%).

Students from urban areas mainly played digital games on their home computers/laptops (*N*=257; 46.6%) and mobile phones (*N*=202; 36.6%), similarly to students from rural areas who also mostly played digital games on their home computers/laptops (*N*=241; 53.7%) and mobile phones (*N*=151; 33.6%).

The preferred digital game genre of students living in urban areas were most often Action games (*N*=101; 19.1%), similar to students living in rural areas who also mostly preferred them (*N*=93; 21.6%). The type of environment that early adolescent live in was not a statistically significant predictor of preferred digital game genre ($\chi^2_{(8)}$=13.3; *p*=.102).

There were no statistically significant differences by the type of environment of early adolescents in relation to the digital games addiction ($t_{(910)}$=-1.90; *p*=.058; *d*=0.13).

Gender

The total sample of 904 early adolescents who played digital games, consisted of 490 (54.2%) male and 414 (45.8%) female participants. As can be observed in Table 4, there were statistically significant differences by gender in all of the observed variables.

Male early adolescents most often played digital games regardless of the time of day (*N*=163; 32.8%), while females mostly preferred playing games only at weekends (*N*=150; 35.6%).

Male students most often played digital games on their home computers/laptops (*N*=328, 65.1%), while female students played games mainly on their mobile phones (*N*=259; 52.1%).

There were statistically significant differences by early adolescent gender related to digital games addiction ($t_{(969)}$=3.29; *p*=.001; *d*=0.21). The addiction was identified for *N*=73 (14.9%) male students, while the percentage was significantly lower in female population (*N*=41; 9.9%).

Table 4

The differences between early adolescents by gender

	Male		Female		t	Sig.	d
	M	SD	M	SD			
Average daily gameplay time [minutes]	186.4	108.7	103.7	87.3	12.7	.000*	0.85
Average weekly gameplay time [hours]	17.6	14.4	8.5	10.6	10.9	.000*	0.73
Length of the period playing digital games [years]	2.7	0.4	1.9	0.3	3.7	.033*	0.27
Playing digital games online	3.0	1.3	2.9	1.3	2.1	.037*	0.08
Playing digital games socially	3.5	1.2	2.7	1.2	9.9	.008*	0.67

M=arithmetic mean, SD=standard deviation, t=student's independent samples t-test, Sig.=statistical significance, d=Cohen's effect size, *p<.05

Male early adolescents mostly preferred Action games (*N*=162; 32.1%), while females mostly preferred Simulations (*N*=154; 29.5%). Comparative answer distribution is presented in Table 5.

Table 5

Preferred digital game genre by early adolescents' gender

Digital game genre	Gender			
	Male		Female	
	N	Percent	N	Percent
Action	**162**	32.1%	32	7.0%
Logic	48	9.5%	89	19.6%
Sports	119	23.6%	39	8.6%
Adventure	35	6.9%	32	7.0%
Social	44	8.7%	17	3.7%
Simulations	**19**	3.8%	**154**	33.8%
Strategies	30	5.9%	85	18.7%
RPG	47	9.3%	**7**	1.5%

Discussion

The paper analyzed the relations between socio-demographic factors, digital gameplay preferences and habits, and the development of gaming addiction. The hypotheses examination was performed by empirical research on the sample of 1262 students aged 11 to 15 from 22 schools.

The hypotheses that were formulated in accordance to defined aims and goals are further discussed.

The S-GAS successfully identified statistically significant differences based on the student gender. The factor analysis confirmed presupposed good psychometric properties of the scale with the satisfactory value of Cronbach's alpha reliability coefficient (α=.71). Having in mind the presented results, it can be concluded that S-GAS is a reliable and valid psychometric instrument, which **confirms hypothesis H_1: The Digital gameplay addiction scale is a valid psychometric instrument**.

S-GAS instrument identified 112 early adolescents who were addicted to digital games. Students with identified addiction mostly played digital games longer than three years. These findings are in accordance with research results presented by Jenson and de Castell (2010) who also noted the constant increase of time that children and adolescents spend playing digital games, especially in the period between 11 and 14 years of age. There were no statistically significant differences in the identified addiction related to the average daily or weekly gameplay time. Researchers (Parker et al., 2013; Schmit, Chauchard, Chabrol, & Sejourne, 2011; Van Rooij et al., 2010) stated that gameplay time should not be observed as direct criterion of digital games addiction. However, the average gameplay time is a statistically significant predictor of preferred digital game genre, as its increase significantly reduced the probability of preferring Logic games. Playing games online and playing games socially are significantly correlated indicators. These results are in accordance with the findings of Lo, Wang, and Fang (2005). Students are expanding their autonomy during the early adolescence, and are more often in the position to make decisions independently. Olson (2010) considered the dual motivation model of playing digital games in preadolescence, and established the existence of a combination of the desire for excitement with the sense of relaxation and positive mood. Digital games addiction significantly predicts preferred digital game genre, which is in accordance to the results of analogue research (Chory & Goodboy, 2011; Müller et al., 2014). Having in mind the presented results, it can be concluded that **hypothesis H_2: The identified digital gameplay addiction is related to early adolescent gameplay preferences and habits has been confirmed**.

There were no statistically significant differences in average weekly and daily gameplay times related to the type of environment (urban/rural). Also, there were no statistically significant differences related to the length of the period that students played digital games, nor according to whether they preferred playing games online or socially. Early adolescents both from urban and rural environments most often played games on their home computers/laptops and smartphones. There were no statistically significant differences related to digital games addiction. Action games were most often the preferred genre in both populations. These findings are in accordance to the results of analogue research (Simons et al., 2014). Based on the presented results, it can be concluded that **hypothesis H_3: There are no statistically significant differences in playing digital games between students from urban and rural environments has been confirmed**.

Gender differences can be clearly identified in children already in the nursery period, and are relatively rigidly maintained during the childhood. These differences become flexible in early adolescence, so it is probable that their retention during adolescence is the consequence of the stereotypes that are imposed by the parents or social environment. Liben and Bigler (2002) stated that sixth grade male students still identify themselves with stereotypically "male" characteristics, while the identification

of girls with typically "female" characteristics is in slight decrease. Having that in mind, it can be expected that digital gameplay preferences and habits of early adolescents are still clearly polarized. Hamlen (2011) noted that the questioned higher grades elementary school boys and girls possess equal level of belief in their gaming abilities.

Early adolescent males played digital games significantly more on a daily and weekly basis than females did (about twice). This result is also in accordance to the findings by Rideout et al. (2010) who noted that male students aged 8 to 18 spent on average twice the time playing video games than females did. They also observed that average gameplay time constantly increased until the eighth grade, after which it decreased along with the onset of adolescence. The results of two studies on the population of students aged 10 to 19 (Greenberg, Sherry, Lachlan, Lucas, & Holmstrom, 2010; Quaiser-Pohl, Geiser, & Lehmann, 2006) also confirmed these findings. Hamlen (2011) stated that male preadolescents had stronger feeling of connecting award with success in playing digital games, which can be the reason that boys spend more time playing these games. The general population, as the players themselves, still consider playing digital games as typically male activity (Fox & Tang, 2014).

Most preferred digital game genre for about 30% of male early adolescents were Action games, while females preferred Simulations in a similar percent, which is in accordance with the findings of Hemlen's (2011) research on the sample of 118 fourth- and fifth-grade students in the US, which indicate correlation between learning strategies and preferred game genre. Homer, Hayward, Frye, and Plass (2012) came to similar conclusion in their research on 213 US students aged 10 to 15. They stated that male students spent about 40% more time playing digital games.

Girls preferred typically "male" digital game genres (Action and Sports) more than boys preferred "female" genres (Social and Logical). Olson (2010) also noted similar findings, and explained it as a consequence of the increasing popularity of digital games with the content created for adults (to which male early adolescents are typically more inclined), and the fact that gender differences gradually disappear as early adolescents are more becoming a part of the population targeted by the creators and designers of commercial-off-the-shelf (i.e., COTS) digital games. Homer et al. (2012) stated that early adolescent males prefer exciting, realistic, violent and social digital games that required strategic planning. Top selling COTS games are generally violent and male adolescents prefer them (Dill, Gentile, Richter, & Dill, 2005), which combined presents the key risk factor for developing problematic gaming habits.

Male early adolescents played digital games for significantly longer period of time and significantly more of them preferred playing games socially than females did. Previous research (Parker et al., 2013; Schmit et al., 2011) confirmed a positive correlation between identifying digital game addiction and time spent playing digital games.

Having in mind previously stated findings, it can be concluded that digital games make a significant and indispensable part of the early adolescents' lives.

Digital game addiction was significantly more often identified among male early adolescent population (14.9%) than among the female population (9.9%). Even

though the difference was significantly larger, it was not extensively expressed as in analogue research (Frölich et al., 2016; Ko et al., 2005) which stated that over 90% of the identified addicts were males.

Having in mind the presented findings, it can be concluded that **hypothesis H_4: Early adolescent males are more inclined to development of digital games addiction has been confirmed**.

Limitations

It is important to state that the research was realized with certain limitations. Even though the sample was adequate in structure and size, and the psychometric instrument was reliable and valid, the conclusions about the identified causal relationship between digital gameplay preferences, habits and addiction cannot be confirmed due to the correlation nature of the research, so the focus of these relations should be clarified by longitudinal research which would add the dynamic dimension.

The integration of additional variables in the research model (extensive information about the students) that could lead to more complex relationship structure was limited by the Serbian Law on personal data protection.

Concluding Remarks

The objective of the research was to question digital gameplay preferences and habits of early adolescents in order to identify and predict student behavior with the aim of efficient development of specific skills and prevention of digital gaming addiction.

Analyzing the phenomenon of digital games from historical perspective, they can be considered as the product of digital revolution that we are still living in. Entertainment that modern technology provides presents the incubator of innovative and often informal forms of knowledge transfer, gaining skills, critical thinking development and problem-solving abilities. Social effects of digital gameplay are obviously extremely important and can be demonstrated on the examples of new grouping formations, organizing and communication between players. By exploring the early adolescent aspirations towards playing digital games and the indirect effects that they have on emotional and psychomotor characteristics, an informed conclusion can be made that digital games practically connect narratives and aesthetic design with the self-actualization possibilities.

Cultural environment plays a significant role in early adolescent lives. Williams, Hendricks, and Winkler (2006) considered gaming as a culture, and stated that the possibility of performing specific operations and tasks can be culturally more valued, and therefore motivating for an individual to become skillful in these areas. However, concerning the educational environment (that early adolescents are a part of) Cuban (2004) believed that rigid social hierarchy plays a significant role in shaping teacher activities, as they were often not willing to change. In order to realize the needs of various student populations, teachers must use different ways of presenting and assessing the

level of content acquisition. The adaptation of teaching methods can be useful for easier understanding and utilization of students' personal aspirations aimed at the development of positive motivation, improving achievement and empowering competences.

The results confirmed previous research findings related to the socio-demographic differences in relation to the manner and time that early adolescents spend playing digital games and the preferred genre. However, the average weekly gameplay time is significantly lower than estimated in analogue studies (Homer et al., 2012), which is probably the consequence of influencing cultural and economic factors. The increase of social pressure in the period of preadolescence often induces the feelings of loss and isolation in boys (Wei, Chen, Huang, & Bai, 2012). The safety of incognito interaction in virtual online environments provides them with the alternative, and as such is often preferred.

Liben and Bigler (2002) stated that sixth grade male students mostly identified themselves with stereotypically male characteristics, while the analogue level of female self-identification somewhat decreased. The results confirmed the assumption that female students have less rigid preferences towards stereotypically "female" digital game genres.

The fact that early adolescents spent significant amount of time playing digital games should not be necessarily interpreted as negative. Playing games in the period of early adolescence can induce various positive psychological effects and meet the socialization needs by using virtual environment. For example, digital game designer could utilize this finding as an incentive for creating educational games.

Digital gameplay culture obviously influences the emotional and cognitive development of early adolescents, and indirectly leads to certain level of adapting their psychological characteristics. This could influence the efficiency of exploiting intelligence potentials and enhance player performance. The presented examples of positive effects of digital gameplay imply that controlled playing of informative and constructive games may support the development of children in the period of early adolescence, and that this potential should be further researched and exploited.

To meet the needs of contemporary "digital" student population, teachers should use the new alternative methods of content presentation far more than presently.

The paper provides empirical innovative and unique insight into otherwise rarely researched connection between early adolescents' digital gameplay preferences, habits and addiction. The additional significance of the research is the innovative approach of predicting student behavior that can lead to more efficient exploit of the educational potential of digital games and the prevention of gaming addiction.

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Preferencije, navike i ovisnost mlađih adolescenata o digitalnim igrama

Sažetak

U radu se daje empirijski utemeljen inovativan i jedinstven uvid u odnose između preferencija, navika i ovisnosti o digitalnim igrama. Uzorak istraživanja sastojao se od 1262 učenika iz 22 škole u Srbiji, u dobi od 11 do 15 godina. Dio istraživanja odnosio se na razvoj i evaluaciju odgovarajućeg psihometrijskog instrumenta. Analiziran je utjecaj socio-demografskih čimbenika na preferencije, navike i ovisnost o digitalnim igrama. U skladu s istraživačkim ciljevima i zadaćama formulirane su istraživačke hipoteze, koje su potvrđene. Rezultati upućuju na postojanje veze između digitalnih igara i ovisnosti kod mlađih adolescenata.

Ključne riječi: *digitalne igre; mlađi adolescenti; ovisnost o igrama.*

Uvod

Stalni porast popularnosti digitalnih igara u posljednja tri desetljeća zasjenio je druge oblike zabave, poput filmova, televizije ili glazbe, osobito među mladima. Dramatičan razvoj industrije digitalnih igara i povećanje broja redovitih igrača usmjerili su pozornost mnogih istraživača na istraživanja kratkoročnih i dugoročnih učinaka igranja digitalnih igara. Mlađi su adolescenti često suočeni sa sofisticiranim digitalnim svjetovima i vizualnom kulturom. Iskustvo igranja digitalnih igara usmjereno je na situacijsku osviještenost, učenje kroz pogreške i razvoj osobnog identiteta rješavanjem problema. Fleksibilni digitalni virtualni svjetovi zahtijevaju aktivnu uključenost igrača. Dok igraju digitalne igre, učenici često nesvjesno usvajaju specifične / prezentirane stavove i znanja.

Unatoč početnoj negativnoj konotaciji vezanoj uz igranje digitalnih igara (Anderson i Bushman, 2001; Anderson i Dill, 2000; Griffiths i Davies, 2005; Irmak i Erdogan, 2015; Ogletree i Drake, 2007), istraživači su intenzivirali svoje zanimanje za istraživanje pozitivnih učinaka. Prije desetak godina Squire (2006) je naglasio da mnogi istraživači neopravdano zanemaruju digitalne igre, iako predstavljaju snažan medij s velikim obrazovnim potencijalom. Igranje digitalnih igara može poboljšati učenje aktiviranjem inteligencije i razvojem spremnosti na suradnju kako bi se riješili problemi te istodobno intenzivirala empatija igrača uz pomoć virtualnog svijeta povezivanjem emocija i kognicije koji pružaju osjećaj produktivnosti i autoriteta.

Istraživači su izjavili da oko 40% populacije u Francuskoj igra digitalne igre (Fortin, Mora, i Trémel, 2006). Analiza strukture mladog stanovništva u Francuskoj pokazuje da 91% djece i mlađih adolescenata (6 – 14 godina) i 95% adolescenata i mladih (15 – 24 godina) redovito igraju digitalne igre. Nadalje, istraživanja preferencija digitalnih igara u SAD-u pokazala su da 97% djece i 53% odraslih igraju videoigre (Barab, Gresalfi, i Ingram-Goble, 2010). Taj veliki obrazovni potencijal nije jednostavno iskoristiti jer zahtijeva određivanje korisnih i smislenih obrazovnih situacija koje mogu pomoći učenicima usvojiti ciljeve, preuzeti legitimne uloge i razvijati korelacije u kontekstu određene discipline. Digitalne igre imaju potencijal osloboditi učenike stigme testiranja i podržati njihovu želju za inovacijama i izazovima kao sastavnim dijelom procesa učenja. Schwartz i sur. (2010) smatraju da se specifične mogućnosti igranja igara mogu preslikati u procjene učeničkih (igračkih) znanja / vještina, te tako dati učitelju (evaluatoru) povratnu informaciju o stupnju razumijevanja problema i usvojenim strategijama rješavanja problema. Kako bi uspješno dostigli sljedeću razinu, iskusni (uspješni) igrači moraju steći višu razinu znanja i vještina potrebnih za rješavanje problema nego igrači početnici. Pobjeda u igri znači da je igrač naučio nešto u tom procesu, jer je određeno vrijeme (često vrlo dugo) trebao uložiti u vježbanje vlastitih sposobnosti.

Osnovno istraživačko pitanje povezano je s istraživanjem odnosa između preferencija, navika i ovisnosti o igranju digitalnih igara. Da bi se provelo empirijsko istraživanja, krenuli smo od pretpostavke da su mlađi adolescenti (učenici) imali brojne prilike igrati digitalne igre (što je gotovo neupitno u modernom društvu) i samostalno stvarati svoje preferencije i navike vezane uz igranje digitalnih igara. Prema teoriji koristi i zadovoljstva (Katz, Blumler, i Gurevitch, 1973), pojedinačne psihološke karakteristike potiču potrebe koje dovode do konstruiranja obrazaca ponašanja, stvaranja preferencija i odabira medija koji omogućuju njihovo ispunjenje.

Pregled relevantne literature

Kafai (2006) je istraživala primjenu obrazovnih igara čiji su sadržaj, grafički prikaz i upute osmislili dizajneri igara, pa je zaključila da su oni zapravo tijekom procesa razvoja ideja i strategija prijenosa znanja imali najviše koristi. U tom je slučaju povezanost konstruktivističkog pristupa s digitalnom / tehnološkom pismenošću valjan preduvjet realizacije. Clark, Tanner-Smith i Killingsworth (2016) navode da su učenici stekli višu kognitivnu sposobnost i intelektualnu otvorenost prilikom igranja digitalnih igara, ali da je većina istraživanja vezana uz tu temu nažalost ograničena na procjenu jesu li igre dobre ili loše za obrazovanje, a ne usredotočuju se na analizu strukture, svrhe ili drugih potencijalnih primjena.

U svojoj metaanalizi Ferguson (2007) ispituje pozitivne i negativne učinke igranja digitalnih igara i zaključuje da je igranje igara povezano s poboljšanjem vizualno-prostornih sposobnosti. Međutim, pitanje zašto je igranje digitalnih igara rezultiralo

navedenim učincima, ostaje neodgovoreno. Nadalje, utvrđeno je da igranje digitalnih igara može povećati samopoštovanje, poboljšati vještine vizualne pažnje, povećati empatiju i socijalnu osjetljivost (Gentile, Swing, Lim, i Khoo, 2012). Također je potvrđeno da igranje digitalnih igara koje potiču kinestetičku aktivnost s pomoću senzora pokreta (npr. Nintendo Wii Fit, Microsoft Kinect) povećava motivaciju za vježbanje i dovodi do poboljšanja fizičkog stanja (Graf, Pratt, Hester i Short, 2009). Olson (2010) je identificirala tri osnovna motivacijska elementa: socijalizacija, prijateljstvo i mogućnost igrača da bude vođa drugim igračima ili da od njih uči. Pobjeda u igri stvara osjećaj uspjeha i ponosa.

Populacija adolescenata pokazala je ekstremno povećanje zanimanja za igranje digitalnih igara u posljednjih nekoliko desetljeća, pa se digitalne igre danas mogu smatrati središnjim dijelom kulture mladih. Ograničeno i kontrolirano igranje igara predstavlja vrlo korisno sredstvo za emocionalni oporavak i opuštanje (Prot, Anderson, Gentile, Brown i Swing, 2014). Međutim, nedostatak kontrole može lako dovesti do razvoja ovisnosti o igranju digitalnih igara, prema zaključcima nekih istraživača (Desai, Krishnan-Sarin, Cavallo i Potenza, 2010; Lin, Ko i Wu, 2011; Poli i Agrimi, 2011), koji smatraju da je u ekstremnim slučajevima gotovo 15% populacije adolescenata u određenoj mjeri razvilo ovisnost o digitalnim igrama.

Pregled literature također ukazuje na činjenicu da su istraživači ujedinjeni u stavu da su digitalne igre postale valjani obrazovni alat, ali da postoji relativno malen broj empirijskih istraživanja o odnosima između ovisnosti o digitalnim igrama i preferencijama i navikama igranja igara kod mlađih adolescenata, čime se naglašava važnost ovoga istraživanja.

Ovisnost o digitalnim igrama

Suvremeni istraživači (Griffiths i Davies, 2005; Parker, Summerfeldt, Taylor, Kloosterman, i Keefer, 2013) usmjereni su na razvoj ovisnosti o igranju digitalnih igara kao posljedice dugotrajne i nekontrolirane igre. Ovisnost o digitalnim igrama i patološko kockanje često se percipiraju kao slični problemi. Kognitivna izloženost, tolerancija i euforija zajednički su kriteriji povezani s uključenošću igrača u igru. Da bi se razmotrila uključenost kao ovisnost, potrebna je identifikacija prisustva sukoba, simptoma povučenosti, recidiva i istaknutosti (Wood, 2007). Osnovna razlika između redovnih igrača i ovisnika je u gubitku kontrole.

Ovisnost o igranju digitalnih igara definirana je kao izrazito kompulzivno igranje digitalnih igara koje može rezultirati društvenim i / ili emocionalnim problemima (Lemmens, Valkenburg, i Peter, 2009). Tejeiro Salguero i Morán (2002) definiraju nekoliko kriterija za identifikaciju ovisnosti o igranju digitalnih igara u adolescenata:

- Povećanje vremena provedenog u razmišljanju, planiranju i podsjećanju na igranje;
- Neraspoloženje i iritacija zbog nemogućnosti igranja;

- Povećanje vremena provedenog u igranju u teškim trenutcima kao bijeg od stvarnosti;
- Nemogućnost kontrole vremena provedenog u igranju i skrivanje stvarnog vremena od roditelja i prijatelja;
- Preskakanje obroka, skraćivanje vremena provedenog na spavanje i neizvršavanje dogovorenih zadataka kako bi imali više vremena za igranje.

Griffiths i Davies (2005) definiraju ovisnost o digitalnim igrama putem sedam pokazatelja:

- Istaknutost – igranje igara postaje važan dio života, obuzima misli, osjećaje i utječe na ponašanje. Igrači ignoriraju obveze i društvene aktivnosti i fokusiraju se isključivo na igranje igara. Kako ovisnost napreduje, jača nedostatak interesa za društvenu interakciju i odnose.
- Tolerancija – igrači postupno povećavaju vrijeme igranja, što je u izravnoj vezi s razvojem ovisnosti o digitalnim igrama (Van Rooij, Schoenmakers, Vermulst, Van den Eijnden, i Van de Mheen, 2010). Međutim, taj se čimbenik ne može promatrati neovisno o drugima, jer pojedinci pokazuju različite simptome.
- Povučenost – neugodan osjećaj ili fizički učinak koji se pojavljuje kada je aktivnost iznenada prekinuta ili nepravilno ostvarena. Kod ovisnika o digitalnoj igri manifestira se bijesom i nasilnim mislima prema svima koji ometaju igru.
- Modifikacija raspoloženja - odnosi se na subjektivne osjećaje tijekom igranja (uzbuđenje, privlačnost itd.). Igrači često zamjenjuju životne probleme s osjećajem užitka tijekom igranja. Intenziviranje problema izravno je povezano s učestalošću i trajanjem igranja digitalnih igara.
- Recidiv – igrač neuspješno pokušava kontrolirati igranje digitalnih igara. U kombinaciji s istaknutošću, često dovodi do ekstremne ovisnosti. Na primjer, adolescenti često reagiraju agresivno i bijesno kada njihovi roditelji pokušavaju ograničiti vrijeme igranja.
- Sukob – iskazuje se laganjem, varanjem ili verbalnom / fizičkom agresijom. Sukobi mogu biti unutarnji (osobni) ili vanjski (s drugima). Igrači mogu ignorirati higijenu, jelo i / ili spavanje kako bi produžili vrijeme provedeno u igranju igara.
- Problemi – ovisnost o digitalnim igrama može dovesti do smanjenja školskog uspjeha, raskida s emocionalnim partnerom i nedostatka osobne higijene.

Visoka razina depresije često se identificira kod ovisnika o digitalnim igrama (Yen, Ko, Yen, Wu, i Yang, 2007). Mehroof i Griffiths (2010) navode da je razvoj ovisnosti o digitalnim igrama u izravnoj vezi s anksioznošću. Obitelj bi trebala imati ključnu ulogu u sprečavanju ovisnosti. Razvoj ovisnosti u populaciji adolescenata češća je pojava u obiteljima s poremećenim / neadekvatnim / lošim unutarnjim odnosima (Feng, Yan, Guo, Wang, Li, i An, 2003). Jang, Hwang i Choi (2008) navode da je ovisnost o digitalnim igrama očito povezana s kulturnim okruženjem.

Skala ovisnosti o digitalnim igrama

Kako bi se utvrdila ovisnost o digitalnim igrama, istraživači su razvili različite instrumente procjene koji se često temelje na prilagođenim instrumentima za procjenu patološkog kockanja (Grüsser, Thalemann i Griffiths, 2007; Lemmens i sur., 2009). Lemmens i sur. (2009) izradili su dvije inačice skale ovisnosti o igrama za adolescente: cjelovitu skalu koju čini 21 čestica i kraću skalu sa sedam čestica. Čestice se procjenjuju prema petostupanjskoj Likertovoj ljestvici. Početna psihometrijska procjena kraće inačice skale izvršena je na dva uzorka učenika (N_1=352 i N_2=369), u dobi od 12 do 18 godina. Dobiveni koeficijenti pouzdanosti pokazali su zadovoljavajuću unutarnju konzistenciju skale (α1=,86 i α2=,81). Eksploratornom faktorskom analizom utvrđena je jednofaktorska struktura, a rezultati konfirmatorne faktorske analize potvrdili su dobru prikladnost faktorske strukture ($\chi2_{(28)}$=69,90; p <,001; CFI=,97; RMSEA=,05 [90% CI (,03-,06)]).

Lemmens i sur. (2009) navode primjere korelacije ovisnosti o digitalnim igrama sa sljedećim psihosocijalnim karakteristikama:

- Duljina vremena provedenog u igranju (r=,58, p <,001) – smatra se nedovoljnim pokazateljem ovisnosti, iako problematični igrači provode više vremena igrajući igre (Parker i sur., 2013);
- Zadovoljstvo životom (r=-,29; p <,001) – potvrđena je očekivana negativna korelacija, jer adolescenti pronalaze bijeg od problema stvarnoga života u intenziviranju igranja igara (Ko i sur., 2005);
- Samoća (r=,31; p <,001) – smatra se najznačajnijim prediktorom razvoja ovisnosti (Seay i Kraut, 2007);
- Socijalna kompetencija (r=-,18, p <,001) – istraživači (Caplan, 2002; Lo i sur., 2005) zaključuju da je intenzivno igranje igara negativno povezano sa socijalizacijom;
- Agresivnost (r=,26; p <,001) – Hauge i Gentile (2003) navode da postoji izravna veza između ovisnosti o digitalnim igrama i agresivnog ponašanja.

Skala ovisnosti o igrama prevedena je na nekoliko jezika (Baysak, Kaya, Dalgar i Candansayar, 2016; Gaetan, Bonnet, Brejard i Cury, 2014; Heon, Sun, Jung i Choi, 2009; Irmak i Erdogan, 2014; Lemos, Cardoso i Sougey, 2016), i potvrđena je kao psihometrijski valjan instrument. Na temelju navedenih rezultata, srpska verzija skale ovisnosti o digitalnim igrama za mlađe adolescente (S-GAS) prevedena je i prilagođena prema izvornoj kraćoj inačici Skale ovisnosti o igrama za adolescente sa sedam čestica (Lemmens i sur., 2009). Odgovori se bilježe prema petostupanjskoj Likertovoj ljestvici, gdje 1 znači nikad, a 5 gotovo uvijek, uz dodatni odgovor – ne znam. Kako bi se osigurala valjanost skale, koristila se tehnika prevođenja / i ponovnog prevođenja prevedenoga teksta na izvorni jezik, pri čemu su angažirana dva stručna prevoditelja.

Metodologija istraživanja

Digitalne igre dio su svakodnevnog života većine mlađih adolescenata i ne smije se previdjeti njihov utjecaj na kognitivni, psihomotorni i afektivni razvoj, zbog čega su istraživanja o preferencijama i navikama igranja ne samo aktualna već i neophodna.

Istraživački je problem utvrditi kako su preferencije i navike igranja digitalnih igara kod mlađih adolescenata povezane s razvojem ovisnosti o digitalnim igrama. Ograničavanjem uzorka na populaciju mlađih adolescenata (11 – 15 godina) omogućena je analiza individualnih razlika i njihov utjecaj na igranje digitalnih igara.

Osnovni je cilj istraživanja analizirati odnose između socio-demografskih čimbenika, preferencija i navika igranja digitalnih igara i razvoja ovisnosti o igrama.

Definirana su četiri dodatna cilja istraživanja:

1. Istražiti psihometrijske značajke S-GAS instrumenta koji se koristi za prepoznavanje ovisnosti o digitalnim igrama.
2. Utvrditi značajnost preferencija i navika igranja igara za razvoj ovisnosti o digitalnim igrama.
3. Istražiti moguće razlike u igranju igara između učenika iz urbanih i ruralnih sredina.
4. Utvrditi utječe li spol mlađih adolescenata na igranje digitalnih igara i razvoj ovisnosti o digitalnim igrama.

U skladu s definiranim ciljevima, formulirane su četiri istraživačke hipoteze koje su dodatno objašnjene.

H_1: S-GAS je valjani psihometrijski instrument.

Obrazloženje: Očekivana valjanost prevedene i prilagođene kraće inačice od sedam čestica Skale ovisnosti za adolescente (Lemmens i sur., 2009) temelji se na rezultatima relevantnih istraživanja (Baysak i sur., 2016; Gaetan i sur., 2014, Heon i sur., 2009; Irmak i Erdogan, 2014; Lemos i sur., 2016).

H_2: Identificirana ovisnost o digitalnim igrama povezana je s preferencijama i navikama igranja kod mlađih adolescenata.

Obrazloženje: Pretpostavka se temelji na rezultatima relevantnih istraživanja (Chory i Goodboy, 2011; Müller i sur., 2014) koja su potvrdila da su igrači ovisni o akcijskim igrama pokazali najvišu razinu ekstraverzije, komunikacije i spontane reakcije u komunikaciji s drugim igračima.

H_3: Nema statistički značajnih razlika u igranju digitalnih igara između učenika iz urbanih i ruralnih sredina.

Obrazloženje: Pretpostavka se temelji na istraživanju provedenom na uzorku od 373 nizozemska učenika u dobi od 12 do 16 godina, čiji su rezultati potvrdili da nema statistički značajnih razlika u vremenu provedenom u igranju igara i preferiranom žanru digitalnih igara između mlađih adolescenata u urbanim i ruralnim sredinama (Simons, de Vet, Brug, Seidell i Chinapaw, 2014).

H_4: Muški mlađi adolescenti skloniji su razvoju ovisnosti o digitalnim igrama.

Obrazloženje: Frölich, Lehmkuhl, Orawa, Bromba, Wolf i Görtz-Dorten (2016) prikazali su rezultate kliničkih istraživanja o ovisnosti adolescenata o digitalnim igrama i zaključili da su oko 90% identificiranih ovisnika muškarci. Ti su podatci u skladu i s rezultatima prethodnih istraživanja (Ko, Yen, Chen, Chen, i Yen, 2005).

U skladu s navedenim hipotezama, definirane su i objašnjene sljedeće istraživačke varijable:

- Vrijeme provedeno u igranju digitalnih igara – varijabla je operacionalizirana s pomoću upitnika o navikama i preferencijama igranja digitalnih igara. Učenici su odgovarali na pitanja o vremenu u kojem igraju digitalne igre, koliko često i koliko dugo, na kojim uređajima i igraju li igre *online*;
- Preferirani žanr digitalnih igara – definiran je na temelju 8-dimenzionalne kategorizacije digitalnih igara (Aleksić, Ivanović, Budimac i Popescu, 2016): arkadne (akcijske / igre pucanja / platformske), avanturističke, sportske (borba), simulacije (vožnja / letenje), strateške, logičke (slagalice), *online* (društvene) i igre igranja uloga (RPG);
- Pokazatelj digitalne ovisnosti o igrama – identificiran je na temelju sedam kriterija: istaknutost, tolerancija, povučenost, modifikacija raspoloženja, recidiv, sukobi i problemi - operacionalizirani s pomoću S-GAS skale;
- spol – muški / ženski – varijabla definirana dvjema kategorijama;
- dob – varijabla definirana kroz pet kategorija (11; 12; 13; 14; 15);
- okolina - urbana/ seoska – varijabla je definirana dvjema kategorijama.

Istraživanje je 2015. godine provedeno na uzorku od ukupno 1262 učenika u dobi od 11 do 15 godina u 22 srpske škole, od kojih se njih 14 nalazilo u urbanim područjima (N=723; 60,4% učenika), a osam u ruralnim područjima (N=539; 39,6% učenika). Pri odabiru ispitanika vodilo se računa o tome da budu ravnomjerno zastupljene različite geografske, gospodarske i društveno-kulturne sredine. Prije provedbe istraživanja škole su dale pristanak za sudjelovanje u istraživanju. Učenici su anonimno i dobrovoljno ispunili upitnik u školama za oko 30 minuta.

Prvim dijelom upitnika (demografska obilježja) prikupljeni su osnovni podatci o ispitanicima, a drugi je dio (preferencije i navike igranja digitalnih igara) bio usmjeren na učeničko igranje digitalnih igara i sastojao se od 14 pitanja s višestrukim izborom (svaki sa šest ponuđenih odgovora). Učenici su odgovarali na pianja koliko često i koliko dugo igraju digitalne igre, na kojim uređajima, igraju li ih s drugima i / ili *online*, i koji žanr digitalnih igara preferiraju. Da bi se načinila valjana procjena prosječnog vremena koje mlađi adolescenti tjedno provode igrajući digitalne igre, prikupljeni su podatci o tome kojim danima u tjednu i u kojem dijelu dana učenici obično igraju digitalne igre. Ta se metoda smatra znatno preciznijom od jednostavne samoprocjene prosječnog dnevnog vremena koje učenici provode igrajući igre, jer je učinkovitija u

aktiviranju autobiografskog pamćenja (Schwarz i Sudman, 2012). Digitalna ovisnost o igrama utvrđena je s pomoću S-GAS skale sa sedam čestica koja je bila distribuirana u drugom dijelu upitnika.

Ukupno N=98 upitnika (7,8%) nije uzeto u obzir jer su bili nepotpuni ili pogrešno ispunjeni, tako da je valjani uzorak od N=1164 činilo N=598 (51,4%) dječaka i N=566 (48,6%) djevojčica, mlađih adolescenata. Prosječna dob ispitanika bila je M=13,0 (SD=1,32) godina.

U skladu s teorijsko-empirijskom prirodom istraživanja, a s ciljem provjere definiranih hipoteza, ispitanici su testirani s pomoću deskriptivno-analitičke neeksperimentalne metode na temelju koje je utvrđena raspodjela svojstava i odnosa među varijablama. Analiza statističkih podataka provedena je s pomoću softverskog paketa IBM SPSS Statistica v22. Primijenjene su sljedeće metode: deskriptivna statistika (frekvencija, postotak, aritmetička sredina (M), standardna devijacija (*SD*), minimum, maksimum, (a)simetričnost, spljoštenost), Kolmogorov-Smirnovljev test distribucija, korelacijska analiza, $\chi 2$ test, t-test za nezavisne uzorke, unutarnji koeficijent pouzdanosti (Cronbachova alfa), Kaiser-Meyer-Olkinova (KMO) mjera adekvatnosti uzorka, Bartlettov test, faktorska analiza (eksploratorna i konfirmatorna faktorska analiza), analiza varijance (ANOVA) i regresijska analiza.

Rezultati

Psihometrijska procjena S-GAS-a

Da bi se izvršila psihometrijska procjena prevedene / prilagođene skale ovisnosti o igrama, analizirane su njezine čestice, prezentirani su deskriptivni statistički rezultati, provedena je faktorska analiza i izmjerena je unutarnja konzistencija.

Monotetički pristup tumačenju rezultata pretpostavlja da S-GAS identificira ovisnost samo ako su ispunjeni svi kriteriji, kako bi se izbjegla precijenjenost učestalosti (Charlton i Danforth, 2007). Smatra se da su kriteriji zadovoljeni ako je vrijednost odgovora za svaku česticu ≥ 3. Taj pristup omogućuje utvrđivanje valjane razlike između uobičajenog ponašanja i ovisnosti.

Deskriptivna statistika

Kvaliteta skale ocijenjena je na temelju analize strukture odgovora. Distribucija valjanih 8148 mogućih odgovora (sedam čestica u 1164 upitnika) bila je kako slijedi: 1697 (20,8%) odgovora 1; 885 (10,9%) odgovora 2; 2534 (31,1%) odgovora 3; 1558 (19,1%) odgovora 4; 1014 (12,4%) odgovora 5 i 460 (5,6%) odgovora 6 – ne znam. Na temelju zadovoljavajuće ravnomjerne raspodjele rezultata može se zaključiti da je skala dobro oblikovana. Deskriptivni pokazatelji kao i pokazatelji normalne distribucije za svaku česticu skale prikazani su u Tablici 1.

Tablica 1

Razlike među rezultatima prema spolu studenata utvrđene su s pomoću t-testa. Rezultati pokazuju statistički značajne razlike prema spolu učenika za sljedeće kriterije:

istaknutost ($t_{(1156)}$=-3,46, p=,001, d=0,20), modifikacija raspoloženja ($t_{(1113)}$=10,4; p<,001, d=0,62), recidiv ($t_{(1102)}$=11,4; p<,001; d=0,69) i sukob ($t_{(1119)}$=6,94; p<,001; d=0,41). Statistički značajne razlike prema spolu nisu zabilježene za sljedeće kriterije: tolerancija ($t_{(1047)}$=9,77; p<,001, d=0,60), problemi ($t_{(1110)}$=2,45; p=,015; d=0,15) i povučenost ($t_{(1158)}$=1,80; p=,072; d=0,11).

Mlađe adolescentice postigle su više rezultate (M=2,84; *SD*=1,00) za kriterij istaknutost od adolescenata (M=2,63; *SD*=1,10). Vrijednost *t* bila je pozitivna za svaki kriterij ovisnosti osim za istaknutost, što je potvrdilo pretpostavku da su mlađi adolescenti (dječaci) skloniji razvijanju ovisnosti o digitalnim igrama.

Dječaci su postigli najviše rezultate za kriterij tolerancija (M=3,50; *SD*=1,13), a najniže za kriterij istaknutost (M=2,63; *SD*=1,10). Djevojke su postigle najviše rezultate za kriterij povučenost (M=3,25; *SD*=1,24), a najniže za sukob (M=2,18; *SD*=1,15).

Na temelju analize rezultata *t*-testa može se zaključiti da je S-GAS pokazao sposobnost utvrđivanja razlika u izvedbi između spolova i da su dječaci postigli najviše rezultate.

Faktorska analiza i pouzdanost

Valjanost faktorske analize najprije je testirana s pomoću Kaiser-Meyer-Olkinove (KMO) mjere adekvatnosti uzorka i Bartlettova testa. Budući da je vrijednost KMO indeksa bila zadovoljavajuća (0,785), a rezultat Bartlettova testa ($\chi^2_{(21)}$=1102,9; p<,001) bio je statistički značajan, potvrđeno je da se može provesti faktorska analiza strukture S-GAS skale i da je uzorak primjeren.

Eksploratorna faktorska analiza provedena je metodom maksimalne vjerojatnosti s ortogonalnom (varimax) rotacijom. Vrijednost jednofaktorskog rješenja bila je zadovoljavajuća (1,79) i objasnila je 25,6% varijance odgovora. Rezultat je dalje testiran konfirmatornom faktorskom analizom primjenom metode maksimalne vjerojatnosti. Dobivene vrijednosti pokazatelja primjerenosti ($\chi^2_{(11)}$=15,49; p<,001; χ^2/df=1,41; RMSEA=,019 [90% CI (,000-,039)]; SRMR=,016; CFI=,996; GFI=,996) zadovoljavajuće su, što je u skladu s pretpostavljenim modelom. Na temelju rezultata može se zaključiti da je S-GAS pokazao dobre psihometrijske karakteristike, kao što se očekivalo na temelju izvornog istraživanja koje su proveli Lemmens i sur. (2009).

Vrijednost koeficijenta pouzdanosti (Cronbachova alfa) bila je α=,71, a vrijednosti korigirane ukupne korelacije bile su unutar zadovoljavajućeg raspona (0,16 - 0,52). Prosječni rezultat S-GAS skale bio je M=2,99 (*SD*=0,64).

Preferencije i navike igranja digitalnih igara

Ukupno N=140 (13,4%) mlađih adolescenata navelo je da ne igraju digitalne igre. Prosječno tjedno vrijeme provedeno u igranju igara za N=904 (86,6%) učenika koji su naveli da igraju digitalne igre bilo je 13,4 sata (*SD*=13,6). Raspon odgovora bio je od 0 do 42 sata. Učenici su proveli prosječno 148,5 minuta dnevno (*SD*=107,7) igrajući digitalne igre. Najveća skupina od N=156 (14,9%) učenika igrali su digitalne

igre 60 minuta dnevno. Pregled postotka prosječnog dnevnog vremena igranja igara prikazan je na slici 1.

Slika 1

Prosječno tjedno vrijeme igranja statistički je značajan prediktor preferiranog žanra digitalnih igara ($\chi^2_{(8)}$=87,1; p<,001). Povećanje tjednog vremena igranja za jedan sat znatno smanjuje vjerojatnost preferiranja logičkih igara za 5,8% (p<,001) i povećava vjerojatnost preferiranja akcijskih igara za 2,7% (p=,049) i igara igranja uloga (RPG) za 3,2% (p=,042).

Okolina u kojoj mlađi adolescenti žive nije se pokazala statistički značajnim ($\chi^2_{(8)}$=13,3; p=,102) prediktorom preferiranog žanra digitalnih igara.

Spol učenika pokazao se značajnim prediktorom ($\chi^2_{(8)}$=388,3; p<,001) preferiranog žanra digitalnih igara. Za mlađe adolescentice utvrđena je znatno manja vjerojatnost preferiranja akcijskih igara za 96,4% (p<,001), avanturističkih za 66,5% (p=,002), sportskih za 94,1% (p<,001), simulacija za 83,5% (p<,001) i igara igranja uloga za 97,3% (p<,001).

Dob mlađih adolescenata nije bio statistički značajan prediktor preferiranog žanra digitalnih igara ($\chi^2_{(32)}$=36,9; p=,252).

Ovisnost o digitalnim igrama

Na uzorku od 904 mlađih adolescenata koji su igrali digitalne igre, analizom S-GAS rezultata identificirano je 112 (12,4%) učenika ovisnih o digitalnim igrama. Kao što se može vidjeti u tablici 2, utvrđene su statistički značajne razlike u dužini vremena koje su mlađi adolescenti proveli igrajući digitalne igre i preferiranog igranja igara u društvu.

Tablica 2

Mlađi adolescenti koji su identificirani kao ovisnici o digitalnim igrama uglavnom (N=42; 37,5%) su igrali digitalne igre bez obzira na dio dana, a učenici koji nisu ovisnici većinom su igrali digitalne igre samo vikendom (N=227; 28,2%).

Mlađi adolescenti ovisni o digitalnim igrama najčešće su igrali igre na kućnom / prijenosnom računalu (N=64; 57,1%) i mobilnom telefonu (N=31; 27,7%), slično kao i učenici koji nisu ovisni o igrama, a koji su također uglavnom igrali na kućnom / prijenosnom računalu (N=434; 48,8%) i mobilnom telefonu (N=322; 36,2%).

Nitko od mlađih adolescenata ovisnika nije naznačio da ne voli igrati igre u društvu. Preferirano *online* i igranje igara u društvu značajno je povezano ($r_{s\,(897)}$=,22; p <,001).

Ovisnost o digitalnim igrama značajan je prediktor ($\chi^2_{(8)}$=24,0; p=,002) željenog žanra digitalne igre. Kod mlađih adolescenata koji nisu identificirani kao ovisnici znatno je bila manja vjerojatnost da preferiraju akcijske igre za 80,8% (p=,008), sportske za 74,8% (p=,030), *online* / društvene igre za 73,6% (p=,041), strateške za 78,9% (p= ,024) i igre igranja uloga za 79,0% (p=,026).

Socio-demografski čimbenici

Okolina

Ukupno 496 (54,9%) mlađih adolescenata koji igraju digitalne igre živi u urbanim sredinama, a 408 (45,1%) ih živi u ruralnim područjima. Nije bilo statistički značajnih razlika u bilo kojoj promatranoj varijabli, što je vidljivo iz tablice 3.

Tablica 3

Mlađi adolescenti koji žive u urbanim sredinama najčešće su igrali digitalne igre samo vikendom (N=142; 28,1%), a učenici u seoskim područjima najčešće su igrali bez obzira na dan u tjednu (N=117; 28,5%).

Učenici iz urbanih sredina uglavnom su igrali digitalne igre na kućnim / prijenosnim računalima (N=257; 46,6%) i mobilnim telefonima (N=202; 36,6%), slično kao i učenici iz ruralnih područja koji su također uglavnom igrali digitalne igre na svojim kućnim / prijenosnim računalima (N=241; 53,7%) i mobilnim telefonima (N=151; 33,6%).

Preferirani žanr digitalnih igara učenika koji žive u urbanim područjima najčešće su bile akcijske igre (N=101; 19,1%), slično kao učenicima koji žive u ruralnim područjima (N=93; 21,6%). Okolina u kojoj žive mlađi adolescenti nije se pokazala statistički značajnim prediktorom preferiranog žanra digitalne igre ($\chi^2_{(8)}$=13,3; *p*=,102).

Statistički značajne razlike nisu utvrđene ni prema okolini u kojoj mlađi adolescenti žive u odnosu na ovisnost o digitalnim igrama ($t_{(910)}$=-1,90; *p*=,058; *d*=0,13).

Spol

Od 904 mlađa adolescenta koji su igrali digitalne igre, 490 (54,2%) su adolescenti i 414 (45,8%) su adolescentice. Kao što se može vidjeti u tablici 4, statistički značajne razlike prema spolu utvrđene su za sve promatrane varijable.

Tablica 4

Mlađi adolescenti najčešće su igrali digitalne igre bez obzira na dan u tjednu (N=163; 32,8%), a adolescentice su uglavnom igrale igre samo vikendom (N=150; 35,6%).

Učenici su najčešće igrali digitalne igre na svojim kućnim / prijenosnim računalima (N=328; 65,1%), a učenice su uglavnom igrale na svojim mobilnim telefonima (N=259; 52,1%).

Statistički značajne razlike prema spolu utvrđene su kod mlađih adolescenata s obzirom na ovisnost o digitalnim igrama ($t_{(969)}$=3,29; *p*=,001; *d*=0,21). Ovisnost je utvrđena kod N=73 (14,9%) dječaka, a postotak je značajno manji u populaciji djevojčica (N=41; 9,9%).

Mlađi adolescenti uglavnom su preferirali akcijske igre (N=162; 32,1%), a adolescentice su uglavnom preferirale simulacijske igre (N=154; 29,5%). Komparativna distribucija odgovora prikazana je u tablici 5.

Tablica 5

Rasprava

U radu su analizirani odnosi između socio-demografskih čimbenika, preferencija i navika vezanih uz igranje digitalnih igara, kao i razvoja ovisnosti o igrama. Hipoteze su testirane empirijskim istraživanjem na uzorku od 1262 učenika u dobi od 11 do 15 godina, polaznika 22 škole.

U nastavku slijedi analiza hipoteza koje su formulirane u skladu s definiranim ciljevima istraživanja.

Statistički značajne razlike na temelju spola učenika uspješno su identificirane uz pomoć S-GAS skale. Faktorskom su analizom potvrđena dobra psihometrijska svojstva skale sa zadovoljavajućom vrijednošću koeficijenta pouzdanosti (Cronbachova alfa) (α=,71). S obzirom na prethodno opisane rezultate, može se zaključiti da je S-GAS pouzdan i valjan psihometrijski instrument, što **potvrđuje hipotezu H_1: Skala ovisnosti o digitalnim igrama je valjani psihometrijski instrument.**

S pomoću S-GAS instrumenta identificirano je 112 mlađih adolescenata koji su ovisni o digitalnim igrama. Učenici za koje je potvrđena ovisnost uglavnom su igrali digitalne igre duže od tri godine. Ti su podatci u skladu s rezultatima istraživanja koje su provele Jenson i de Castell (2010), koji su također pokazali stalno povećanje vremena koje djeca i adolescenti provode igrajući digitalne igre, posebno u dobi od 11 do 14 godina. Nisu utvrđene statistički značajne razlike u identificiranoj ovisnosti koja se odnosi na prosječno dnevno ili tjedno vrijeme igranja. Istraživači (Parker i sur., 2013; Schmit, Chauchard, Chabrol i Sejourne, 2011; Van Rooij i sur., 2010) navode da vrijeme igranja ne bi trebalo promatrati kao izravan kriterij ovisnosti o digitalnim igrama. Međutim, prosječno vrijeme igranja statistički je značajan prediktor preferiranog žanra digitalnih igara, jer je njegovo povećanje značajno smanjilo vjerojatnost preferiranja logičkih igara. Igranje *online* igara i igranje igara u društvu značajno su korelirali. Ti su podatci u skladu s rezultatima Lo, Wang i Fang (2005). Učenici povećavaju autonomiju tijekom rane adolescencije, i češće su u poziciji da samostalno donose odluke. Olson (2010) je analizirala dvostruki motivacijski model igranja digitalnih igara u predadolescenciji i utvrdila postojanje kombinacije želje za uzbuđenjem te osjećaja opuštanja i pozitivnog raspoloženja. Ovisnost o digitalnim igrama značajni je prediktor preferiranog žanra digitalnih igara, što je u skladu s rezultatima sličnih istraživanja (Chory i Goodboy, 2011; Müller i sur., 2014). Na temelju prikazanih rezultata može se zaključiti da je **potvrđena hipoteza H_2: Utvrđena ovisnost o digitalnim igrama povezana je s preferencijama i navikama igranja igara kod mlađih adolescenata.**

Statistički značajne razlike nisu zabilježene za prosječno tjedno i dnevno vrijeme igranja igara s obzirom na okolinu (urbana / ruralna). Također, nisu utvrđene statistički značajne razlike u odnosu na duljinu igranja digitalnih igara, kao ni načina igranja – *online* ili u društvu. Mlađi adolescenti, neovisno žive li u urbanoj ili u ruralnoj sredini, najčešće su igrali igre na svojim kućnim / prijenosnim računalima i

pametnim telefonima. Nisu utvrđene statistički značajne razlike s obzirom na ovisnost o digitalnim igrama. Akcijske igre bile su najčešće preferirani žanr u obje populacije. Navedeni su podatci u skladu s rezultatima sličnih istraživanja (Simons i sur., 2014). S obzirom na prikazane rezultate, može se zaključiti da je **hipoteza H_3 potvrđena: Nema statistički značajnih razlika u igranju digitalnih igara između učenika iz urbanih i ruralnih sredina.**

Razlike prema spolu mogu se jasno identificirati kod djece već u najranijoj dobi i uglavnom ostaju nepromijenjene tijekom djetinjstva. Te razlike postaju fleksibilnije u ranoj adolescenciji, no ako se navedene razlike ne smanje tijekom adolescencije, razlog su vrlo vjerojatno stereotipne uloge koje uglavnom nameću roditelji ili društvo. Liben i Bigler (2002) izjavile su da se dječaci – učenici šestih razreda još uvijek poistovjećuju sa stereotipnim «muškim» karakteristikama, a da je poistovjećivanje djevojaka s tipičnim „ženskim" karakteristikama u blagom padu. S obzirom na navedeno može se očekivati da su preferencije i navike vezane uz digitalne igre u populaciji mlađih adolescenata još uvijek jasno polarizirane. Hamlen (2011) zaključuje da ispitani učenici i učenice viših razreda osnovne škole posjeduju jednaku vjeru u svoje sposobnosti igranja igara.

Mlađi adolescenti igrali su digitalne igre značajno više na dnevnoj i tjednoj razini od adolescentica (otprilike dvostruko više). Ti su podatci također u skladu s rezultatima Rideout i sur. (2010), prema kojima su učenici u dobi od 8 do 18 godina starosti proveli u prosjeku dvostruko više vremena igrajući igre od učenica. Također su primijetili da se prosječno vrijeme igranja stalno povećavalo do osmog razreda, nakon čega je slijedilo smanjenje do kojega je došlo s početkom adolescencije. Rezultati dvaju istraživanja u kojima su sudjelovali učenici u dobi od 10 do 19 godina (Greenberg, Sherry, Lachlan, Lucas i Holmstrom, 2010; Quaiser-Pohl, Geiser i Lehmann, 2006) također su potvrdili prethodno opisane rezultate. Hamlen (2011) je naglasila da muški predadolescenti imaju jači osjećaj povezivanja nagrade s uspjehom u igranju digitalnih igara, što može biti razlogom da dječaci provode više vremena igrajući digitalne igre. Igranje digitalnih igara u cijeloj populaciji, kao i među samim igračima, još uvijek se smatra tipično muškom aktivnošću (Fox i Tang, 2014).

Najčešće preferirani žanr digitalnih igara za otprilike 30% mlađih adolescenata bile su akcijske igre, a adolescentice su najčešće preferirale simulacijske igre u sličnom postotku, što je u skladu s rezultatima istraživanja koje je provela Hamlen (2011) na uzorku od 118 učenika četvrtih i petih razreda u SAD-u, a koji pokazuju postojanje korelacije između strategija učenja i preferiranog žanra igara. Homer, Hayward, Frye i Plass (2012) došli su do sličnog zaključka u istraživanju u kojemu je sudjelovalo 213 američkih učenika u dobi od 10 do 15 godina. Istaknuli su da su dječaci proveli otprilike 40% više vremena igrajući digitalne igre.

Djevojčice su preferirale tipične „muške" žanrove digitalnih igara (akcijske i sportske igre) više nego što su dječaci preferirali „ženske" žanrove (društvene i logičke igre). Olson (2010) je također došla do sličnih rezultata koje je objasnila kao posljedicu povećanja popularnosti digitalnih igara sa sadržajima predviđenima za odrasle

(kojima su dječaci u ranoj adolescenciji obično skloniji) i kao činjenicu da spolne razlike postupno nestaju kako mlađi adolescenti sve više postaju dio populacije na koju se usmjeravaju kreatori i dizajneri digitalnih igara – takozvanih komercijalnih proizvoda s police (COTS). Homer i sur. (2012) navode da dječaci u ranoj adolescenciji preferiraju uzbudljive, realistične, nasilne i društvene digitalne igre koje zahtijevaju strateško planiranje. Najprodavanije igre s polica u pravilu su nasilne i muški ih adolescenti preferiraju (Dill, Gentile, Richter, i Dill, 2005), što kombinirano predstavlja ključni čimbenik rizika za razvoj problematičnih navika igranja.

Muški su mlađi adolescenti igrali digitalne igre znatno duže, i znatno veći broj adolescenata preferira igranje igara u društvu u usporedbi s adolescenticama. Prethodna istraživanja (Parker i sur., 2013; Schmit i sur., 2011) potvrdila su pozitivnu korelaciju između identifikacije ovisnosti o digitalnim igrama i vremena provedenog u igranju digitalnih igara.

Imajući u vidu prethodno navedene rezultate, može se zaključiti da digitalne igre čine značajan i neizostavan dio života mlađih adolescenata.

Ovisnost o digitalnim igrama znatno se češće identificira u populaciji mlađih adolescenata (14,9%) nego u populaciji adolescentica (9,9%). Iako je razlika bila značajno velika, ona nije toliko velika kao u sličnim istraživanjima (Frölich i sur., 2016; Ko i sur., 2005) u kojima je utvrđeno da je više od 90% identificiranih ovisnika bilo muškoga roda.

Na temelju prikazanih rezultata može se zaključiti da je **hipoteza H_4 potvrđena: Muški mlađi adolescenti skloniji su razvoju ovisnosti o digitalnim igrama.**

Ograničenja

Nužno je naznačiti da postoje određena ograničenja vezana uz provedbu opisanoga istraživanja. Iako je uzorak bio primjeren s obzirom na strukturu i veličinu, a psihometrijski je instrument bio pouzdan i valjan, zaključke o identificiranoj kauzalnoj vezi između preferencija, navika i ovisnosti o digitalnim igrama nije moguće potvrditi zbog korelacijske prirode istraživanja, stoga je navedene odnose nužno razjasniti longitudinalnim istraživanjem koje bi dodalo dinamičku dimenziju.

Uključivanje dodatnih varijabli u istraživački model (detaljnije informacije o učenicima) koje bi mogle rezultirati složenijim strukturama odnosa bilo je ograničeno srpskim Zakonom o zaštiti osobnih podataka.

Zaključne napomene

Svrha istraživanja bila je ispitati preferencije i navike igranja digitalnih igara među mlađim adolescentima, kako bi se prepoznalo i predvidjelo ponašanje učenika, s ciljem učinkovitog razvoja specifičnih vještina i sprečavanja ovisnosti o digitalnim igrama.

Analizirajući fenomen digitalnih igara iz povijesne perspektive, one se mogu smatrati proizvodom digitalne revolucije u kojoj živimo. Zabava koju nudi moderna tehnologija predstavlja inkubator inovativnih i često neformalnih oblika prijenosa

znanja, stjecanja vještina, razvoja kritičkog mišljenja i sposobnosti rješavanja problema. Društveni učinci igranja digitalnih igara očito su iznimno važni i mogu se pokazati na primjerima novih grupnih formacija, organiziranja i komunikacije među igračima. Na temelju proučavanja želja mlađih adolescenata vezanih uz igranje digitalnih igara i njihovih neizravnih učinaka na emocionalne i psihomotorne karakteristike, može se zaključiti da digitalne igre zapravo povezuju priče i estetsku izvedbu s mogućnošću samoostvarenja.

Kulturalno okruženje ima značajnu ulogu u životima mlađih adolescenata. Williams, Hendricks i Winkler (2006) smatraju igru kulturom i drže da mogućnost izvođenja određenih operacija i zadataka može biti više cijenjena unutar određene kulture, a samim time može i snažnije motivirati pojedinca da postane vještiji u navedenim područjima. Međutim, kada se govori o odgojno-obrazovnom okruženju (kojemu mlađi adolescenti pripadaju), Cuban (2004) smatra da stroga društvena hijerarhija ima značajnu ulogu u oblikovanju nastavnih aktivnosti, budući da često nisu spremni na promjene. Kako bi se ostvarile potrebe različitih populacija učenika, nastavnici se moraju koristiti različitim načinima poučavanja i ocjenjivanja razine usvojenosti sadržaja. Adaptacija nastavnih metoda može biti korisna za lakše razumijevanje i korištenje osobnih aspiracija učenika usmjerenih na razvoj pozitivne motivacije, poboljšanje postignuća i osnaživanje kompetencija.

Rezultati ovoga istraživanja potvrdili su rezultate prethodnih istraživanja vezanih uz socio-demografske razlike vezane uz način i vrijeme koje mlađi adolescenti provode igrajući digitalne igre i željeni žanr. Međutim, prosječno tjedno vrijeme igranja znatno je manje od procijenjenog vremena opisanoga u sličnim istraživanjima (Homer i sur., 2012), što je vjerojatno posljedica utjecaja kulturnih i ekonomskih čimbenika. Povećanje društvenog pritiska u razdoblju predadolescencije često izaziva osjećaj gubitka i izolacije kod dječaka (Wei, Chen, Huang, i Bai 2012). Sigurnost anonimne interakcije u virtualnom mrežnom okruženju pruža im alternativu koju ta populacija često preferira.

Liben i Bigler (2002) zaključile su da su se dječaci – učenici šestih razreda – uglavnom identificirali sa stereotipno muškim osobinama, a da je analogna razina ženske samoidentifikacije nešto smanjena. Rezultati potvrđuju pretpostavku da su preferencije prema stereotipnim „ženskim" žanrovima digitalnih igara manje čvrsto određene u slučaju učenica.

Činjenicu da su mlađi adolescenti proveli značajno više vremena igrajući digitalne igre, ne bi trebalo nužno tumačiti kao negativnu. Igranje igara u razdoblju rane adolescencije može rezultirati različitim pozitivnim psihološkim učincima i zadovoljiti potrebe socijalizacije uz pomoć virtualnog okruženja. Na primjer, tvorci digitalnih igara mogu iskoristiti prikazane rezultate kao poticaj za dizajniranje odgojno-obrazovnih igara.

Kultura igranja digitalnih igara očito utječe na emocionalni i kognitivni razvoj mlađih adolescenata, a neizravno dovodi do određene razine prilagođavanja njihovih

psiholoških karakteristika. To bi moglo utjecati na učinkovitost iskorištavanja potencijala za razvoj inteligencije i poboljšati učinkovitost igrača. Prikazani primjeri pozitivnih učinaka igranja digitalnih igara podrazumijevaju da kontrolirano igranje informativnih i konstruktivnih igara podržava razvoj djece u razdoblju rane adolescencije, te da taj potencijal treba dalje istraživati i iskorištavati.

Da bi se zadovoljile potrebe suvremene „digitalne" učeničke populacije, nastavnici bi se trebali daleko više koristiti novim alternativnim metodama prezentacije sadržaja.

Rad daje empirijski inovativan i jedinstven uvid u nedovoljno istraženu povezanost preferencija, navika i ovisnosti mlađih adolescenata o digitalnim igrama. Dodatni značaj istraživanja ogleda se u inovativnom pristupu predviđanju ponašanja učenika koji može dovesti do učinkovitijeg iskorištavanja odgojno-obrazovnog potencijala digitalnih igara i sprečavanja ovisnosti o igrama.