Relationship between Digital Game Playing Motivation and Problem Solving Skill

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Abstract

The study was performed to examine university students' digital game playing motivation and problem solving skill levels. The research group consists of totally *586* students, *326* male and *260* female study at Bingöl University Physical Education and Sports Academy (PESA), Faculty of Arts and Sciences, and Faculty of Engineering and Architecture during the *2019-2020* academic year. "Digital Game Playing Motivation Scale" and "Creative Problem Solving Inventory (CPSI)" were used to obtain data for the purpose of the research. The students participating in the study were asked personal information questions regarding their demographic characteristics. The study was carried out in SPSS *22* statistical package program and the degree of significance was taken as *0.05*. Independent Sample T (Independent Sample) and Mann Whitney-Utest in binary comparisons, One-Way Variance Analysis (One Way Anova) in multiple comparisons and Kruskal Wallis Analysis in abnormally distributed data, and correlation (Pearson) test to determine the relationship between variables. According to the responses given by the students who participated in the study, there was a significant difference between the groups in terms of gender, faculty and the daily game play time variables on the digital platform, while there was no significant difference between the groups in problem solving skills. According to the results of the correlation analysis, a low level of significant correlation was found between students' digital game playing motivation and problem solving skill levels.

Keywords: Digital game, Problem solving, Motivation, Sport.

Contents

Contribution of this paper to the literature
This study helps to reveal the relationship between digital game playing behavior and problem solving skill; it will be a resource for future studies.

1. Introduction

Especially in the recent years, games played in virtual platforms have become popular due to the fact that individuals are affected by the electronic industry and keep up with the age. Such games are considered as digital games in the literature due to their technology and the need for tools such as computers, tablets, smartphones and game consoles (Bányai, Griffiths, Király, & Demetrovics, 2018; Taylor, 2012). Digital games are games that are programmed with various technologies and enable users to log in with a visual environment (Cetin, 2013). These games, which are programmed with various software and using various technologies, are classified as digital console games, computer games and online games according to the technology used (Gökçearslan & Durakoğlu, 2014). Although there are different opinions regarding the types of preference regarding digital games, they are classified as Action / adventure, simulation, sports, role play / animation, racing and strategy (Irmak & Erdoğan, 2016).

As the interest in online games and the popularity of these games increase in the world, concerns about overuse by people also increase. Considering the American Psychiatric Association's definition of mental disorder that requires professional treatment, it is especially necessary to separate excessive use from addiction. Considering the content of the definition of the American Psychiatric Association, it is necessary to determine what constitutes a situation that requires professional treatment. Mental disorder according to APA; clinically important behavioral or psychological syndromes that arise in an individual and are associated with existing distress, incompetence (dysfunction in one or more important functional areas), or significantly increased risk of death, pain, disability or a significant loss of freedom, or are patterns (American Psychiatric Association, 2001) transferred by. Kuss and Griffiths (2012). The reasons for playing games in most of the researches about computer games are stated as follows;

- There is nothing to do like an entertaining or a challenging thing.
- Providing rivalry, social communication, diversity, energizing effect and imaginative environments.
- Spending time, relaxing or avoiding stress.
- Turning back many times, providing a long timefocusable environment.
- Reasons such as resting, spending time, getting away from the time, escaping from real life and being free are also the reasons that lead individuals to play games (Horzum, Ayas, & Cakırbalta, 2008).

In addition to the items written above; it is also possible for the individual to want to socialize through the game, that is, the individual wants to spend more time and socialize with his friends thanks to a game, and that they face the fear of being excluded because they do not play in that environment.

Problem solving; basically, it is a conflict situation where the individual faces with an obstacle in reaching a goal. Inhibition makes it difficult to achieve the target. In such a situation, problem solving is to find the best way to overcome the obstacle (Morgan, 1999). Besides, problem solving is the process that one goes through from feeling the problem to finding a solution for him/her (Atabay, 2004; Bingham, 2004; Korkut, 2002). It is also a complex mental process that includes high-level thinking, remembering, evaluation of available information, making decisions and evaluating results (Ulupınar, 1999). In other words, problem solving is a method of understanding the environment and controlling it with this way (Sahin & Ramazan, 2000).

Problem solving skill is the level of being able to obtain information that will lead the person to a solution and apply it to the solution of a problem by combining it to be ready for use. Human life is full of problems in different numbers and structures that need to be solved. Sometimes, one problem emerges before another, or many problems occur at the same time and life becomes meaningful with the solution of problems. Problem solving sequence consisting of problem determination, information gathering, goal setting, planning, and application and also evaluation stages is used in every day of life (Bahar, 2006).

When these evaluations are taken into account; it is seen that motivation resources of people to play digital games are affected by many situations. Thus, while this study helps to reveal the relationship between digital game playing behavior and problem solving skill, it will serve as a source for future studies in the literature.

2. Material – Method

The study group of this research, which was performed out to examine the digital game playing motivation and problem solving skill levels of university students, is consisted of totally *586* students and *326* male and *260* female study at Bingöl University Physical Education and Sports Academy (PESA), Faculty of Science and Letters and Faculty of Engineering and Architecture during the *2019-2020* academic year. In the research, "survey method" was used as a data collection tool. The questionnaire consists of *3* sections and a total of *32* questions. In the first part, there are *5* statements about demographic variables. In the second part, "Digital Game Playing Motivation Scale" developed by Tekkurşun-Demir and Hazar (2018) and in the third part "Creative Problem Solving Properties Inventory (CPSPI) " which was developed by Lin (2010) and adapted to Turkish by Bulut-Baran, İpek, and Aygün (2018) was used. The data collected via the digital game playing motivation scale and creative problem solving inventory were analyzed through the statistical package program SPSS.*22* program and the results were interpreted. Descriptive statistics including arithmetic average, standard deviation, frequency and percentage distributions are presented in order to gain insight into demographic information and other group questions. Correlation (Pearson) test was used to determine the relationship between digital game motivation and problem solving skill levels. In order to determine the relationship between digital game motivation and problem solving skill levels with some demographic variances, the normality of the distributions (Kolmogorov-Smirnov) and then Skewness and Kurtosis tests were examined. In the research, "normal" expression scores are individuals whose Z value varies between *-3* and *+3*, while "extreme values" are scores whose Z value is outside the range of *-3* and *+3*.

Besides, according to Shao (2002) the normal distribution of the data to be used in the study depends on the values of Skewness and Kurtosis between ± *3*. Independent Sample T (Independent Sample T) and Unidirectional Variance Analysis (One Way Anova) tests were applied for variables with normal distribution according to the test results, and Mann Whitney-U and Kruskal Wallis Test was applied for variables that did not show normal distribution. If there is a difference between the variables, Tukey HSD and Dunnet T*3* tests were used according to the homogeneity results from the Post-Hoc tests to determine which group or groups originated from this difference. The results were evaluated at *95%* confidence interval and significance level at p <*0.05*.

3. Findings

In this section, the statistical results of the study will be explained. Statistical analysis based on the demographic characteristics of the people participating in the research will be included.

Table-1. Distributions of students according to demographical variances.

	Demographical Variances	N	%
Gender	Male	326	55.6
	Female	260	44.4
Faculty	PESA	244	41.6
	Faculty of Science and Letters	148	25.3
	Faculty of Engineering and Architecture	194	33.1
Digital Game Playing Hour	*1* hour and less	298	50.9
	2-3 hours	177	30.2
	4-5 hours	75	12.8
	6 hours and over	36	6.1
Grade Average	*40-54*	44	7.5
	55-74	307	52.4
	75-90	204	34.8
	91 and over	31	5.3
Total		586	100

When the Table 1 is examined, it is determined that *55.36%* of the students participating in the study are male and 44.4% are female. As a result of examining the types of faculties / schools where students are studying, it was determined that 41.6% of the students studied in Physical Education and Sports Academy, *25.3%* in the Faculty of Science and Letters, and *33.1%* in the Faculty of Engineering and Architecture. As a result of examining thedaily play time of the students on the digital platforms, 50.9% of them are 1 hour or less, 30.2% of them are *2-3* hours, 12.8% of them are 4-5 hours and finally 6.1% of them are playing 6 hours and over. They were found to be playing games on the platforms. In conclusion, it was determined that 7.5% of students had a Grade Point Average between 40-54, 52.4% between 55-74, 34.8% between 75-90 and 5.3% of 91 and over.

Table-2. Comparison of digital game playing motivatiinabd problem solving skills of the students according to gender variance.

		Gender	N	X	S.s	t	p
Digital Game Playing Motivation Sub Dimensions	Success and Refreshing	Male	326	3.04	.993	3.850	.000***
		Female	260	2.70	1.099		
	Curiosity and Social Acceptance	Male	326	3.18	1.120	4.507	.000***
		Female	260	2.77	1.117		
	Uncertainty in Game Wish	Male	326	3.08	1.127	-.435	.000***
		Female	260	3.12	1.199		
Digital Game Playing Motivation General		Male	326	3.15	.928	3.470	.001**
		Female	260	2.87	.987		
Problem Solving Skill General		Male	326	3.78	.819	-.115	.908
		Female	260	3.79	.779		
Total			586				

Note: $p<0.001$*** $p<0.01$**.

When the Table 2 is examined, while there is a meaningful difference between the groups in the digital game playing motivation sub-dimensions and digital game motivation general levels according to the gender variable of the students participating in the study, and there was no significant difference determined in the problem solving skill levels between the groups (p <*0.05*).

When the Table 3 is examined, it was found that while there was a significant difference between the groups of motivation and social acceptance and the levels of curiosity and social acceptance and the overall digital game playing motivation according to the faculty / school variable where the students participating in the study (p <*0.05*), there was no significant difference found between groups in problem solving skill levels (p>*0.05*). According to the Post-Hoc test results to determine between which groups the difference is, in the sub dimensions of both digital game playing motivation general levels and its sub dimensions, there was a difference found only between Faculty of Engineering and Architecture students and Faculty of Science and Letters, PESA students.

When the Table 4 is examined, while there is a significant difference between groups in terms of digital game playing motivation sub-dimensions and general digital game play motivation levels according to the daily play time variable of the students participating in the study (p <*0.05*), there was no significant difference found between the groups in problem solving skill levels (p <*0.05*). p>*0.05*.

Table-3. Comparison of digital game playing motivation and problem solving skills of students according to faculty variance.

		Faculty	N	X	S.s	f	p	
Digital Game Playing Motivation Sub Dimensions	Success and Refreshing	[a]Pesa	244	3.00	1.036	3.960	.020*	a>c
		[b]Science and Letters	148	2.91	1.070			
		[c]Engineering and Architecture	194	2.72	1.049			
	Curiosity and Social Acceptance	[a]Pesa	244	3.17	1.111	10.242	.000***	a,b> c
		[b]Science and Letters	148	3.09	1.129			
		[c]Engineering and Architecture	194	2.70	1.122			
	Uncertainty in Game Wish	[a]Pesa	244	3.19	1.088	2.045	.130	
		[b]Science and Letters	148	3.10	1.134			
		[c]Engineering and Architecture	194	2.97	1.253			
Digital Game Playing Motivation General		[a]Pesa	244	3.17	.903	7.917	.000***	a,b> c
		[b]Science and Letters	148	3.07	.975			
		[c]Engineering and Architecture	194	2.81	.994			
Problem Solving Skill General		[a]Pesa	244	3.79	.801	.185	.831	
		[b]Science and Letters	148	3.75	.837			
		[c]Engineering and Architecture	194	3.80	.775			
Total			586					

Note: p<0.001*** p<0.05*.

Table-4. Comparison of digital game playing motivation and problem solving skill levels of the students according to daily gaming time on digital platform.

		Digital Game Playing Time	N	X	S.s	Sd	X^2	p	
Digital Game Playing Motivation Sub Dimensions	Success and Refreshing	[a]1 hour and less	298	2.44	.946	3	117.966	.000***	d,c,b> a
		[b]2-3 hours	177	3.24	.910				
		[c]4-5 hours	75	3.44	.986				
		[d]6 hours and over	36	3.71	1.031				
	Curiosity and Social Acceptance	[a]1 hour and less	298	2.63	1.085	3	67.173	.000***	d,c,b> a
		[b]2-3 hours	177	3.29	1.014				
		[c]4-5 hours	75	3.40	1.105				
		[d]6 hours and over	36	3.75	1.161				
	Uncertainty in Game Playing	[a]1 hour and less	298	2.89	1.191	3	18.123	.000***	c,d,b> a
		[b]2-3 hours	177	3.29	1.045				
		[c]4-5 hours	75	3.35	1.116				
		[d]6 hours and over	36	3.30	1.234				
Digital Game Playing Motivation General		[a]1 hour and less	298	2.68	.904	3	84.862	.000***	d,c,b> a
		[b]2-3 hours	177	3.31	.852				
		[c]4-5 hours	75	3.42	.901				
		[d]6 hours and over	36	3.64	1.046				
Problem Solving Skill General		[a]1 hour and less	298	3.76	.818	3	1.861	.602	
		[b]2-3 hours	177	3.80	.762				
		[c]4-5 hours	75	3.76	.810				
		[d]6 hours and over	36	3.93	.838				
Total			586						

Note: p<0.001***.

Table-5. Comparison of digital game playing motivation and problem solving skill levels of the students according to grade average variance.

		Grade Average	N	X	S.s	Sd	X^2	p
Digital Game Playing Motivation Sub Dimensions	Success and Refreshing	[a]40-54	44	2.89	1.118	3	1.333	.721
		[b]55-74	307	2.93	.997			
		[c]75-90	204	2.83	1.120			
		[d]91 and over	31	2.77	1.098			
	Curiosity and Social Acceptance	[a]40-54	44	2.96	1.191	3	1.513	.679
		[b]55-74	307	3.05	1.125			
		[c]75-90	204	2.92	1.147			
		[d]91and over	31	3.05	1.129			
	Uncertainty in Game Wish	[a]40-54	44	2.98	1.154	3	2.922	.404
		[b]55-74	307	3.10	1.129			
		[c]75-90	204	3.15	1.214			
		[d]91and over	31	2.85	1.080			
Digital Game Playing Motivation General		[a]40-54	44	2.96	1.018	3	1.100	.777
		[b]55-74	307	3.07	.935			
		[c]75-90	204	2.99	1.000			
		[d]91and over	31	2.94	.950			
Problem Solving Skill General		[a]40-54	44	3.48	.978	3	7.437	.059
		[b]55-74	307	3.78	.744			
		[c]75-90	204	3.87	.800			
		[d]91and over	31	3.69	.976			
Total			586					

Note: p>0.05.

According to the results of the Mann Whitney-U test conducted to determine which groups the difference is, the difference was found among students in both the digital game playing motivation general level and the digital game playing motivation sub-dimensions is 1 hour per day and less with the students playing on the digital platform. When the Table5 is examined, there was no significant difference found between the groups in terms of motivation and problem solving skill levels of digital games according to the grade point average of the students participating in the study (p>*0.05*).

Table-6. Correlation analysis that reflects relationship between digital game playing motivation and problem solving skill levels of the students.

			Problem Solving Skill
Digital Game Playing Motivation	r	1	.091*
	p	-	.028
	n	586	

Note: p<*0.05**.

When the Table6 is examined, a positive but low level meaningful relationship was determined between the digital game playing motivation and problem solving skill levels of the students who participated in the study (p <0.05).

4. Discussion and Result

The study was performed out to examine university students' motivation to play digital games and problem solving skill levels. The research group consists of a total of *586* students, *326* male and *260* female studying at Bingöl University Physical Education and Sports Academy (PESA), Faculty of Arts and Sciences, and Faculty of Engineering and Architecture during the *2019-2020* academic year.

In the gender variance finding of the study, there was a significant difference between the digital game playing motivation dimensions and digital game playing averages between the groups. It was determined that male students had higher motivation and overall averages in digital game playing compared to female students. When the literature is analyzed, similar results were obtained in our study titled "Examining the Relationship between Physical Activity Participation Motivation and Digital Play Motivation" by Tekkursun and Cicioglu (2019). This study supports our study. However, in the research of Hazar (2019) the findings of the research found that male and female participants' motivation to participate in the digital games was similar. There was no significant difference between the groups in the level of problem solving skills in the gender finding of the study. Ozdenk and Kaya (2017)*442* (*140* males, *302* females) students who studied at the School of Physical Education and Sports were found to have no significant difference between their problem solving skill total score and subscale scores. Dönmez and Kaçar (2015) found that there was no significant difference between problem solving skill total score and sub-dimension scores in *103* studies (*37* females, *66* males) studying in the School of Physical Education and Sports. These studies are in the quality of supporting our study. The study conducted by Türkçapar (2009) does not support our study.

According to the faculty / college variable where the students participating in the study, a significant difference was found between the groups in terms of success and refreshing, curiosity and social acceptance, and overall levels of digital gaming motivation, but no significant difference was found between the groups in problem solving skill levels. When the studies on motivation to play digital games are examined in the literature, no study related to the section variable was encountered. No significant difference was found in the relationship between the section variable of our study and problem solving skill levels. When the literature related to this variable is examined; Cevik and Ozmaden (2013) investigated the problem solving skills of physical education and music department students in terms of various variables, and did not obtain meaningful results according to the department variable. Elkin and Karadağlı (2015) concluded that the departments where university students study have no effect on problem solving skills. Bayrak, Inan, and Kartal (2015) did not reach meaningful results between groups in terms of department variable in the study comparing physical education and classroom teacher candidates' problem solving skills. Türkçapar (2009) compared the problem solving skills of physical education and sports academy students and education faculty students against stress, and at the end of the research, he could not find any meaningfulness between the department variance and problem solving. These studies are in the quality of support our study.

In the another variance of the study it was determined that there was a significant difference between the group playing motivation sub-dimensions and the overall average of digital game playing in the game playing finding. In general, the average of those who played *2-3* hours, *4-5* hours and over *6* was higher than those who played *1* hour or less. In the study of Tekkursun and Cicioglu (2019) it was determined that the scores of the participants' uncertainty in the game request and motivation levels of participation in physical activity showed a statistically significant difference according to the daily digital play time. This conducted study is in the quality of supporting our study. It is thought that individuals who have the motivation to play digital games less than *1* hour may be led by doing different activities to spend time, having fun, escaping from stress and relaxing, not having enough time for the game or having little interest in these games. In another variance, there was no significant difference found between the groups in terms of motivation and problem solving skill levels of digital game play according to the grade point average of the students participating in the research. There has been no research found in the literature with this variable. It is thought that this variable of this study will constitute a source for the future studies.

The final finding of our study was found to have a positive but low level of significant relationship between the motivation of digital game play and problem solving skill levels of the students who participated in the study. According to our study, it can be said that problem solving skills increase as digital game motivation increases. He thinks that digital games have positive aspects as well as highlighting negative aspects, and it will be useful to use these positive aspects in terms of the development of people.

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