



(ISSN: 2602-4047)

Yıldırak, A. & Bozkurt, T. M. (2024). The Effect of Educational Games Including Physical Activity on Attitudes Towards Intelligence Games *International Journal of Eurasian Education and Culture* , 9(26), 261-274.

DOI: <http://dx.doi.org/10.35826/ijoecc.1827>

Article Type (Makale Türü): Research Article

THE EFFECT OF EDUCATIONAL GAMES INCLUDING PHYSICAL ACTIVITY ON ATTITUDES TOWARDS INTELLIGENCE GAMES

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Received: 27.02.2024 Accepted: 8.05.2024 Published: 01.06.2024

ABSTRACT

The aim of this study is to examine the effect of educational games that include physical activity on attitudes towards intelligence games. The research group consists of a total of 248 volunteer students, 106 of whom are girls (42.7%) and 142 of whom are boys (57.3%), studying at Bitlis province Sports High School and Hikmet Kiler Science High School. Relational scanning model was used in the research. "Personal Information Form", "Attitude Scale Towards Games Involving Physical Activity" and "Attitude Scale Towards Mind Games" were used as data collection tools in the research. Descriptive statistics were made to determine the demographic characteristics of the students forming the research group; In the analysis of the data, Pearson Correlation analysis was preferred to determine the relationship between variables, and Regression analysis was preferred to determine the direction and level of the relationship. Chronbach alpha value (internal consistency coefficient) of the attitude scale towards educational games involving physical activity; While it was 0.85, it was calculated as 0.81 in this study and was found to be at a very good level. Chronbach's alpha value of the attitude scale towards mind games; While it was 0.89, it was calculated as 0.92 in this study and was found to be at a very good level. As a result, the sub-dimensions of the positive attitude and behavior element of the students' attitude scale towards intelligence games and the attitude variable towards educational games involving physical activity were negative and at a very good level; It was determined that there was a positive and low-level prediction between the negative attitude sub-dimension and the attitude variable towards educational games involving physical activity.

Keywords: Games, Games Involving Physical Activity, Mind Games, Attitude.

INTRODUCTION

Play can be defined as a set of activities that individuals do freely at all ages for the purpose of having fun, learning, socializing and developing their physical skills. Games play an important role for all age groups, from childhood to old age, and bring together many different purposes (Onur, 1995). Nowadays, with the rapid advancement of technology, the popularity of games, has increased the need for innovative methods in education (Efe, 2023). In this context, educational games have become an important tool that both supports the learning process and provides students with information effectively (Yıldız et al., 2017). However, not only in the digital environment, but also educational games that involve physical activity are used to enrich the learning experience and convey information to students more effectively. (Yurdakul et al., 2012).

There is scientific evidence that games that include physical activity play an important role in improving mental and cognitive abilities (Günay & Yılmaz, 2023; Huescar et al., 2020; Metin et. Al.2023). It is thought that these games, along with their positive effects on brain functions, can increase individuals' cognitive skills by supporting their learning processes and help them process information more effectively (Dolu et al., 2016; Erdoğan & Yıldırım 2023). Educational games that include physical activity not only provide students with knowledge but also provide a motivating environment by making learning more fun and interactive. Factors such as students' perception of games as an educational tool, the content of the games, the quality of educational materials, and students' individual learning styles play a critical role in determining this attitude.

More effective learning environments can be created when the positive effects of physical activity on learning processes are combined with intelligence games. Mind games that students combine with physical activity can make their learning processes more impressive and enjoyable. It can also be used as an effective tool to improve students' cognitive skills. These games include the implementation of various group games and activities in a way that positively supports cognitive skill development. The developed activities also include games that involve real-life problems. During intelligence game activities, the learner encounters a problem and develops strategies to solve this problem. In addition, it is aimed to reach a solution within the given time, to choose the right one among possible solutions, to develop a systematic way of thinking and to gain a positive tendency towards the problem solving process (Savaş, 2019; Sural et. Al.2023).

Traditionally, mind games are games that are thought to be effective in developing cognitive skills. However, in recent years, educational games that include physical activity have begun to change the balance in this field, especially with the influence of virtual reality (VR) technology. These games aim to combine both physical and mental activity by stimulating users. At this point, the effects of educational games that include physical activity on attitudes towards intelligence games have begun to come to the fore. In this context; This research was conducted to examine the effect of educational games that include physical activity on attitudes towards intelligence games.

METHOD

Research Model

Relational scanning model was used in this study, which was conducted to determine the relationship between sports high school and science high school students' educational games that include physical activity and their attitudes towards intelligence games. According to Karasar (2007), the relational screening model is defined as "a research model that aims to determine the existence and/or degree of co-variation between two or more variables."

Working Group

The study group consists of a total of 248 volunteers, 106 of whom are women (42.7%) and 142 of whom are men (57.3%), studying at Ziya Eren Sports High School and Hikmet Kiler Science High School in Bitlis province during the 2023-2024 academic year. It consists of students. Information on the demographic variables of the students is given in Table 1.

Data Collection Tools

The data collection form used within the scope of the research consists of two parts. The first part is the Personal Information Form prepared by the researcher; In the second part, validity and reliability were checked, and the "Attitude Scale Towards Games Involving Physical Activity" developed by Hazar (2014) and the "Attitude Scale Towards Intelligence Games" developed by Kurupınar & Aydoğan (2020) were used. The reliability coefficients of the scales are given in Table 2.

Personal Information Form

Sports high school and science high school students' gender, grade level, school type, whether they play games involving physical activity in physical education class, whether they play intelligence games in physical education class (chess, mangala, find and match, etc.) and what kind of games they prefer to play in physical education class. It was created by the researcher to determine demographic characteristics such as the variables they mentioned.

Attitude Scale Towards Playing Games Involving Physical Activity

This scale, developed by Hazar (2014), is a five-point Likert type and consists of 23 items and two subscales. Two sub-dimensions; It is the affective and behavioral sub-dimension of the game. Scale item scores were determined as "Strongly Agree (5 points), Agree (4 points), Undecided (3 points), Disagree (2 points) and Strongly Disagree (1 point)". Within the framework of the determined scores, the highest score that can be obtained from the overall scale is 115 and the lowest score is 23. In order to provide evidence for the reliability

of the scale, Cronbach alpha reliability was calculated and the Cronbach alpha reliability of the entire scale was found to be 0.85. Cronbach's alpha for the first sub-factor "Affective" was 0.83; Cronbach's alpha for the second sub-factor "Behavioral" was found to be 0.61. In this study, the Cronbach Alpha internal consistency coefficient of the scale was determined as ($\alpha=0.92$); 0.76 for the Affective sub-dimension and 0.83 for the Behavioral sub-dimension; It was calculated as .

Attitude Scale Towards Mind Games

This scale, developed by Kurupınar & Aydoğan (2020), is a five-point Likert type and consists of 22 items and 3 sub-dimensions. Three sub-dimensions; It consists of negative attitude, positive attitude and behavioral element sub-dimensions towards intelligence games. Scale item scores were determined as "Strongly Agree (5 points), Agree (4 points), Undecided (3 points), Disagree (2 points) and Strongly Disagree (1 point)". In order to provide evidence for the reliability of the scale, Cronbach alpha reliability was calculated and the Cronbach alpha reliability of the entire scale was found to be 0.89. Cronbach's alpha for the first sub-dimension "negative attitude towards mind games" was 0.89; Cronbach's alpha for the second sub-dimension "positive attitude" was calculated as 0.86, and the Cronbach's alpha for the third sub-dimension "behavioral element" was calculated as 0.81. In this study, the Cronbach Alpha internal consistency coefficient of the scale was determined as ($\alpha=0.81$); 0.67 for the "negative attitude towards mind games" sub-dimension; It was calculated as 0.65 for the "positive attitude" sub-dimension and 0.65 for the "behavioral element" sub-dimension.

Table 1. Reliability Coefficients Of Scales

Scales	Chronbach's Alpha (α)	Number of items
Affective subdimension	,76	11
Behavioral sub-dimension	,83	12
EGIPA total	,92	23
Negative attitude sub-dimension	,67	11
Positive attitude sub-dimension	,65	6
Behavioral element sub-dimension	,64	5
EGIT total	,81	22

Reliability values determined by Özdamar in the literature; $0.00 < \alpha < 0.40$ is given as "not reliable", $0.41 < \alpha < 0.60$ is given as "low reliability", $0.61 < \alpha < 0.80$ is given as "medium level of reliability", $0.81 < \alpha < 1.00$ is given as "high level of reliability" (Özdamar, 1999). When Table 3 is examined, it is seen that Chronbach's Alpha (α) values are moderately sufficient for reliability.

Data Collection and Analysis

Before starting the analysis phase of the research, the researcher went to the schools, obtained the necessary permissions, explained the purpose of the research to the participants and ensured voluntary participation. In

In addition, information is presented on whether statistical assumptions such as normality, homogeneity, linearity and constant variance are met in order to apply the analyses. In addition to this information, it is also explained which statistical analyzes are preferred. Before starting the analysis, skewness and kurtosis values were examined to decide on the tests to be used in the analysis of the data. Since the skewness and kurtosis values presented in Table 3 are between -1.5 and +1.5, which are the limits recommended by Tabachnick & Fidell (2013), it was concluded that the data set showed a normal distribution and therefore parametric tests were used. Data were analyzed using SPSS 22 statistical program. First, descriptive statistics were applied to determine the demographic characteristics of the participants; percentage (%), frequency (f), arithmetic mean (\bar{x}) and standard deviation (Ss) techniques were used. Then, "Independent Samples T-Test" was used for comparisons with two groups, "One-Way Analysis of Variance ANOVA" was used for comparisons with more than two groups, and "Tukey HSD" multiple comparison test was used to determine the source of the difference. "Pearson Correlation and Regression Analysis" was applied to determine the relationship between variables, their direction and level.

Table 2. Descriptive Analysis Of Scales

Variables	n	Min.	Max.	\bar{x}	Ss	Median	Skewness	Kurtosis
Affective Subdimension	248	1,36	4,73	3,49	,607	3,54	-,870	1,185
Behavioral sub-dimension	248	1,17	5,00	2,89	,830	2,83	,323	-,252
EGIPA total	248	1,26	4,78	3,18	,662	3,17	-,108	,214
Negative attitude sub-dimension	248	1,44	4,11	2,65	,516	2,66	,192	-,141
Positive attitude sub-dimension	248	1,00	5,00	2,17	,831	2,16	,806	,907
Behavioral element sub-dimension	248	1,00	5,00	3,07	,852	3,10	,015	-,020
EGIT total	248	1,18	3,18	2,39	,530	2,45	-,046	-,593

When the averages obtained from the sub-dimensions of the Attitude Scale Towards Games Involving Physical Activity are examined, the highest average value is in the "Affective" sub-dimension ($\bar{X}=3.49\pm.607$) and the lowest average value is in the "Behavioral" sub-dimension ($\bar{X}=2.89\pm, 830$). When the averages obtained from the sub-dimensions of the Mind Games Attitude Scale are examined, the highest average value is in the "Behavioral element" sub-dimension ($\bar{X}=3.07\pm.852$), and the lowest average value is in the "Positive attitude" sub-dimension ($\bar{X}=2.17\pm.831$).) is seen to be.

FINDINGS

The findings obtained from the research conducted through some variables in order to examine the effect of educational games involving physical activity on the attitudes of sports high school and science high school students towards intelligence games were presented in the form of tables.

Table 3. Frequency Table For Demographic Variables

Variables		Frequency	Percentage (%)
Gender	Woman	106	42,7
	Male	142	57,3
Grade level	1st Class	38	15,3

	2. Class	99	39,9
	3rd Class	73	29,4
	4th grade	38	15,3
School Type	Science High School	135	54,4
	Sports High School	113	45,6
Do you play games that involve physical activity in physical education class?	Yes	227	91,5
	No	21	8,5
Do you play games involving brain teasers in physical education class?	Yes	62	25,0
	No	186	75,0
What kind of games do you play in physical education class?		212	85,5
	Educational Games Involving Physical Activity	36	14,5

When Table 3 is examined, %42.7 of the research group is female, %57.3 is male, %15.3 is 1st grade, %39.9 is 2nd grade, %29.4 is 3rd grade, %15 is 3 of them were in the 4th grade, %54.4 were studying at Science High School, %45.6 were studying at Sports High School, %91.5 played games involving physical activity in physical education class, and %8.5 were physically active. It was determined that they did not play educational games containing activities, %25.0 played games such as intelligence games, and %75.0 did not play educational games containing intelligence games. It was also determined that %85.5 of them played games involving physical activity in physical education classes, and %14.5 played educational games such as intelligence games.

Table 4. T-Test Analyses For Variables

Variable	EGIPA Affective subdimension	EGIPA Behavioral subdimension	Physical activity attitude subdimension	EGIT Negative attitude subdimension	EGIT Positive attitude subdimension	EGIT Behavioral item subdimension	Intelligence games attitude scale total	p
	$\bar{x} \pm ss$	$\bar{x} \pm ss$	$\bar{x} \pm ss$	$\bar{x} \pm ss$	$\bar{x} \pm ss$	$\bar{x} \pm ss$	$\bar{x} \pm ss$	
Gender								
Woman	3,39±,652	2,74± ,845	3,05±,696	2,53±,463	2,00±,736	2,98±,816	2,31±,490	p<0,00*
Male	3,56±,563	3,00±,804	3,27±,621	2,74±,537	2,30±,877	3,13±,874	2,57±,532	
Statistics	t= -2,182 p< 0,03*	t= -2,493 p= 0,01*	t= -2,595 p=0,01*	t= -3,265 p=0,00*	t= -2,797 p=0,00*	t= -1,385 p=0,16	t= -4,022 p=0,00*	
School Type								
Science High School	3,46±,621	2,80± ,930	3,12±,712	2,60±,504	2,03±,843	3,17±,855	2,37±,536	p<0,00*
Sports High School	3,53±,590	2,99±,726	3,25±,590	2,71±,526	2,35±,785	2,95±,836	2,56±,508	
Statistics	t= -,859 p= 0,39	t= -1,800 p= 0,07	t= -1,555 p=0,12	t= -1,783 p=0,07	t= -3,099 p=0,00*	t= -2,032 p=0,04*	t= -2,721 p=0,00*	
Do you play educational games that involve physical activity in physical education class?								

Yes	3,53±,574	2,93±,840	3,21±,631	2,65±,497	2,15±,786	3,09±,822	2,45±,512	p<0.00*
No	3,12±,817	2,46±,999	2,78±,850	2,68±,708	2,45±1,20	2,86±1,12	2,56±,702	
Statistics	t= 2,934 p= 0,00*	t= 2,486 p= 0,01*	t= 2,923 p=0,00*	t= -,263 p=0,79	t= -1,584 p=0,11	t= 1,163 p=0,24	t= -,947 p=0,34	
Do you play educational games that include brain teasers in physical education class?								
Yes	3,35±,687	2,96±,880	3,14±,707	2,60±,465	2,31±,856	2,85±,857	2,46±,517	p<0.00*
No	3,54±,572	2,87±,815	3,19±,647	2,67±,532	2,13±,820	3,14±,840	2,46±,536	
Statistics	t= -2,178 p= 0,03*	t= ,749 p= 0,45	t= -,457 p=0,64	t= -,946 p=0,34	t= 1,495 p=0,13	t= -2,318 p=0,02*	t= -094 p=0,92	
What kind of games do you play in physical education class?								
Educational Games Involving Physical Activity Educational Games in the Intelligence Typ								p<0.00*
Statistics	t= 4,803 p= 0,00*	t= 4,951 p= 0,00*	t= 5,401 p=0,00*	t= 1,986 p=0,04*	t= ,053 p=0,95	t= 1,579 p=0,11	t= 1,849 p=0,06	

*p<0.05

When Table 4 is examined; While it was determined that there was a statistically significant difference between the gender variable and the total score of the attitude scale towards educational games involving physical activity (EGIPA), the affective and behavioral sub-dimensions and the total score of the attitude scale towards intelligence games (EGIT), negative attitude and positive attitude sub-dimensions (p<0.05); It was determined that there was no significant difference between the behavioral element sub-dimension of the attitude scale towards intelligence games (p>0.05). It was determined that the average scores of male students were higher than the average scores of female students in all of the attitude scale and sub-dimensions towards educational games involving physical activity and the attitude scale and sub-dimensions towards intelligence games. While it was determined that there was a statistically significant difference between the school type variable (EGIT) total score and the negative attitude dimension score average (p <0.05); It was determined that there was no statistically significant difference between the (EGIPA) total score, affective and behavioral sub-dimensions and (EGIT) negative attitude sub-dimension total score (p>0.05). It was determined that the total score average of sports high school students (EGIPA) and the total score average of (EGIT) were higher than science high school students. While it was determined that there was a statistically significant difference between the variable "Do you play games that involve physical activity in physical education class" (EGIPA) total score and the mean scores of the affective and behavioral subscales (p<0.05); It was determined that there was no statistically significant difference between the mean scores of the (EGIT) total score, negative attitude, positive attitude and behavioral element subscales (p>0.05). While it was determined that there was a statistically significant difference between the variable "Do you play games involving mind games in physical education class" and the

mean scores of the (EGIPA) affective sub-dimension and (EGIT) behavioral sub-dimension ($p < 0.05$), the (EGIPA) total score and behavioral sub-dimension It was determined that there was no statistically significant difference between the (EGIT) total score, negative attitude and positive attitude subscale score averages ($p > 0.05$). While it was determined that there was a statistically significant difference between the variable "What kind of games do you play in physical education class" and the mean score of (EGIPA) total score, affective and behavioral sub-dimensions and (EGIT) negative attitude sub-dimension ($p < 0.05$); It was determined that there was no statistically significant difference between the mean scores of the (EGIT) total score, positive attitude and behavioral item subscales ($p > 0.05$). It was determined that the total score average of (EGIPA) and (EGIT) total score average of educational games involving physical activity in physical education course were higher than the educational games containing intelligence games.

Table 5. ANOVA Analysis On Grade Level Variable

Subdimensions	Grade Level	\bar{x}	Ss	F	p	Tukey
Affective subdimension	1st Class	3,62	,494	2,258	0,08	
	2. Class	3,54	,588			
	3rd Class	3,34	,697			
	4th grade	3,52	,536			
Behavioral sub-dimension	1st Class	2,98	,969	2,417	0,06	
	2. Class	3,02	,774			
	3rd Class	2,69	,832			
	4th grade	2,84	,772			
Physical activity scale total	1st Class	3,29	,711	2,683	0,04*	2>3
	2. Class	3,27	,644			
	3rd Class	3,00	,675			
	4th gradel	3,17	,582			
Negative attitude sub-dimension	1st Class	2,67	,537	,683	0,56	
	2. Class	2,60	,497			
	3rd Class	2,71	,526			
	4th gradel	2,65	,533			
Positive attitude sub-dimension	1st Class	2,14	,866	1,577	0,19	
	2. Class	2,05	,709			
	3rd Class	2,29	,899			
	4th grade	2,32	,933			
Behavioral element sub-dimension	1st Class	3,22	,845	3,274	0,22*	3>4
	2. Class	2,98	,765			
	3rd Class	3,26	,879			
	4th grade	2,80	,942			
Intelligence Games Scale Total	1st Class	2,42	,635	,753	0,52	
	2. Class	2,41	,503			
	3rd Class	2,51	,504			
	4th grade	2,51	,539			

* $p < 0.05$

When Table 5 is examined; While it was seen that there was a statistically significant difference between the grade level variable and the (EGIPA) total score and (EGIT) behavioral subscale score average ($p < 0.05$), the (EGIPA) affective and behavioral subscale and (EGIT) total score, negative attitude and positive It was observed that there was no significant difference between the mean scores of the subscales ($p > 0.05$). It was determined that the significant difference in the (EGIPA) total score was caused by 2>3, and the significant difference in the (EGIPA) behavioral subdimension was caused by 3>4.

Table 6. Pearson Correlation Analysis Results

**Correlation $p < 0.01$ / *Correlation $p < 0.05$

Pearson Correlation		Affective subdimension	Behavioral sub-dimension	EGIPA total	negative attitude lower dimension	positive attitude lower dimension	Behavioral element sub-dimension	EGIT total
Affective subdimension	r	1	.659**	.870**	.169**	-.263**	-.121	-.012
	p		.000	.000	.008	.000	.057	.853
	N	248	248	248	248	248	248	248
Behavioral sub-dimension	r	.659**	1	.944**	.142*	-.108	-.199**	.059
	p	.000		.000	.025	.089	.002	.357
	N	248	248	248	248	248	248	248
Physical activity scale total	r	.870**	.944**	1	.168**	-.186**	-.183**	.033
	p	.000	.000		.008	.003	.004	.602
	N	248	248	248	248	248	248	248
Negative attitude sub-dimension	r	.169**	.142*	.168**	1	.478**	.489**	.845**
	p	.008	.025	.008		.000	.000	.000
	N	248	248	248	248	248	248	248
Positive attitude sub-dimension	r	.263**	-.108	-.186**	.478**	1	.467**	.777**
	p	.000	.089	.003	.000		.000	.000
	N	248	248	248	248	248	248	248
Behavioral element sub-dimension	r	-.121	-.199	-.183**	.489**	.467**	1	.525**
	p	.057	.002	.004	.000	.000		.000
	N	248	248	248	248	248	248	248
Intelligence Games Scale Total	r	-.012	.059	.033	.845**	.777**	.525**	1
	p	.853	.357	.602	.000	.000	.000	
	N	248	248	248	248	248	248	248

When Table 6 is examined, according to the analysis results, it is seen that there is a significant relationship between the attitude scale towards educational games that include physical activity and the positive attitude, negative attitude and behavioral element sub-dimensions of the attitude scale towards intelligence games ($p < 0.01$); It was determined that there was no significant relationship between the attitude towards mind games scale total score ($p > 0.05$).

Table 7. Regression Analysis Results

Independent variable	The dependent variable	B	Std. Hata	β	t	p	R	R ²	F	P
EGIPA total	negative attitude	.131	,049	,168	2,66	0,08*	,168	,028	7,107	0,08*
	positive attitude	-.234	,079	-,186	-2,97	0,03*	,186	,035	8,838	0,03*
	Behavioral element	-,236	,081	-,183	-2,92	0,04*	,183	,034	8,554	0,04*

* $p < 0.05$

When the linear regression analysis results are examined in Table 7, the predictive variable is the attitude towards educational games that include physical activity; The predictive variables were determined as the negative attitude, positive attitude and behavioral element sub-dimensions of the attitude scale towards intelligence games. In addition, it was determined that the students' attitude scale towards intelligence games negatively and significantly predicted the negative attitude and behavioral element sub-dimensions and the attitude variable towards educational games involving physical activity ($p < 0.05$). However, it was determined that there was a positive and low-level significant prediction between the negative attitude sub-dimension of the attitude scale towards intelligence games and the attitude variable towards educational games involving physical activity ($p < 0.05$).

CONCLUSION AND DISCUSSION

It consists of a total of 248 volunteer students, 106 of whom are female (42.7%) and 142 of whom are male (57.3%), studying at Ziya Eren Sports High School and Hikmet Kiler Science High School in Bitlis province. Sports high school and science high school students' gender, grade level, school type, whether they play educational games involving physical activity in physical education class, whether they play intelligence games in physical education class (chess, mangala, find and match, etc.) and what kind of games they play in physical education class. It was aimed to examine the relationship between educational games involving physical activity and their attitudes towards intelligence games by analyzing the variables they preferred.

As a result of the analyses, in the gender variable; While it was determined that there was a statistically significant difference between the total score of the attitude scale towards educational games involving physical activity, its affective and behavioral sub-dimensions, and the total score of the attitude scale towards intelligence games, negative attitude and positive attitude sub-dimensions; It was determined that there was no significant difference between the attitude scale towards intelligence games and the behavioral element sub-dimension. It was determined that the average scores of male students were higher than the average scores of female students in all of the attitude scale and sub-dimensions towards educational games involving physical activity and the attitude scale and sub-dimensions towards intelligence games. It was determined that the average scores of male students were higher than the average scores of female students in all of the attitude scale and sub-dimensions towards educational games involving physical activity and the attitude scale and sub-dimensions towards intelligence games.

While it was determined that there was a statistically significant difference between the school type variable and the EGIT total score and negative attitude dimension score average; It was determined that there was no statistically significant difference between the EGIPA total score, affective and behavioral sub-dimensions and the EGIT negative attitude sub-dimension total score. It was determined that the EGIPA total score average and EGIT total score average of sports high school students were higher than the science high school students.

While it was determined that there was a statistically significant difference between the variable "Do you play games that involve physical activity in physical education class" and the average scores of the EGIPA total score and affective and behavioral subscales; It was determined that there was no statistically significant difference between the mean scores of EGIT total score, negative attitude, positive attitude and behavioral element subscales.

While it was determined that there was a statistically significant difference between the variable "Do you play games involving mind games in physical education class" and the mean scores of the EGIPA affective sub-dimension and EGIT behavioral sub-dimension, the EGIPA total score and behavioral sub-dimension and the EGIT total score, negative attitude and positive attitude sub-dimensions It was determined that there was no statistically significant difference between the mean scores.

While it was determined that there was a statistically significant difference between the variable "What kind of games do you play in physical education class" and the EGIPA total score, affective and behavioral sub-dimensions and EGIT negative attitude sub-dimension mean score? It was determined that there was no statistically significant difference between the mean scores of EGIT total score, positive attitude and behavioral item subscales. It was determined that the EGIPA total score average and EGIT total score average of educational games that included physical activity in physical education class were higher than the educational games that included intelligence games.

While it was observed that there was a statistically significant difference between the grade level variable and the EGIPA total score and EGIT behavioral subscale score average, there was no significant difference between the EGIPA affective and behavioral subscale and EGIT total score, negative attitude and positive subscale score averages. It was determined that the significant difference in the EGIPA S total score resulted from 2>3, and the significant difference in the EGIT behavioral subscale resulted from 3>4.

While it was observed that there was a significant relationship between the attitude scale towards educational games involving physical activity and the positive attitude, negative attitude and behavioral element sub-dimensions of the attitude scale towards intelligence games; It was determined that there was no significant relationship between the attitude towards mind games and the total score of the scale. When the regression analysis results were examined, the predictive variable was the attitude towards educational games that included physical activity; The predictive variables were determined as the negative attitude, positive attitude and behavioral element sub-dimensions of the attitude scale towards intelligence games. In addition, it was determined that the students' attitude scale towards intelligence games predicted negatively and significantly at a very good level between the positive attitude and behavioral element sub-dimensions and the attitude variable towards educational games that include physical activity. However, it was determined that there was a positive and low-level significant prediction between the negative attitude sub-dimension of the attitude scale towards intelligence games and the attitude variable towards educational games involving physical activity.

As a result, in line with this information; The general attitudes of the students towards mind games were evaluated as positive. The general attitude towards educational games involving physical activity was evaluated negatively. Attitude towards mind games is related to positive attitude and behavioral elements. In other words, students' positive attitudes include positive behaviors towards intelligence games. Attitude towards educational games that include physical activity represents a variable in which students generally exhibit a negative attitude towards these games. The research shows that positive attitudes and behavioral elements towards intelligence games negatively predict positive attitudes towards educational games that include physical activity. In other words, as students' positive attitudes towards intelligence games increase, their positive attitudes towards educational games that include physical activity decrease. Additionally, increasing negative attitudes increases negative attitudes towards educational games that include physical activity.

As a result of the literature review, studies that support the research findings and have different opinions were identified. In the study conducted by Yıldız (2023), it was stated that traditional games and intelligence games are important educational tools in developing children's mental skills. Altun (2017) stated that applying intelligence games and physical activities together will be an effective method to improve visual perception. In another study, Öztürk (2016) stated that teaching with games increases memory retention and develops broader thinking skills. Tatlısu & Kan (2023) stated that sports are a certain factor in the attitude towards intelligence games. Soydan et al., (2021) stated that educational games positively affect intelligence. Duran (2020) emphasized in his study that physical activity is an important variable for emotional intelligence. Sarı (2021) stated that the intelligence scores of students who do sports are higher than those of students who do not do sports. Yıldırım and Tazegül (2021) commented that physical activity has a positive effect on intelligence. Siregar et al., (2023) stated that learning physical activity with game strategies increases logical intelligence. In their study, Maillot et al. (2012) stated that participation in physically simulated sports games contributes positively to cognitive and physical skills. Another study stated that physical activity supports the emergence of mental functions (Tomporowski, 2011). Altun (2013) stated in his study that educational games will contribute positively to the intelligence development of 11-12 year old children. Korkmaz (2018) stated that educational games not only make lessons fun, but also have a positive impact on students' cognitive development.

SUGGESTIONS

- It can investigate the effect of educational games that include physical activity on mental games in more depth.
- The demographic characteristics of the students who constitute the sample of the research can be focused more on and the generalizability of the results can be increased.
- A more comprehensive research can be conducted, including other regions where similar studies have been conducted and different education levels.

ETHICAL TEXT

In this article, the journal writing rules, publication principles, research and publication ethics, journal ethical rules were followed. The responsibility belongs to the author for any violations that may arise regarding. It was deemed appropriate by the decision of Bitlis Eren University Ethical Principles and Ethics Committee numbered 25.01.2024/01-9 and E.4972.

Author(s) Contribution Rate: In this study, the contribution rate of the first author is %50 and the contribution rate of the second author is %50.

In this study, I would like to extend my sincere thanks to my esteemed instructor, Tuğba MUTLU BOZKURT, for her generous guidance and to my colleague Emrullah Yılmaz for being a supportive companion throughout the journey.

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