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Investigating the effect of intellectual computer games on creative thinking skills and increasing concentration in children of divorce

Sophia Khaneghahi[1*], Afsaneh Pudineh[2], Mohammad Aref Mahmoud Zehi[3]
Department of Psychology, Zahedan Branch, Islamic Azad University, Zahedan, Iran[1*]
Educational Psychology, Islamic Azad University, Zahedan, Iran[1,2]
nargesmiranisargazi@gmail.com[1,2,3]

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Abstract
Purpose: The main purpose of this study is to investigate the effect of intellectual computer games on creative thinking skills and increase concentration in children of divorce.
Research methodology: The statistical population of the study includes all single parent children 7 to 10 years old in Zahedan in the academic year 2021-2022. To select the research sample, first 40 people were available as a sample through cluster random sampling. Data collection tools in this study included a questionnaire.
Results: Findings showed that intellectual computer games affect increasing creative concentration and thinking in children of divorce. Based on the findings, it can be stated that computer games are a mental and cognitive activity that leads children to reach high levels of thinking and increase their concentration and creative thinking.
Limitations: One of the most important limitations of the present study is that due to the timing of the conference, researchers did not have enough time to conduct follow-up tests to sustain the impact of brain teasers.
Contribution: Another use of mind games is in teaching and learning, especially for single parents and divorced children who have less concentration. Therefore, due to the high desire and tendency of children to computer games.
Keywords: *Intellectual Computer Games, Creative Thinking Skills, Increase Concentration, Children of Divorce*
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1. Introduction

Today, technological advances have not only affected the space and environment in which humans live but have also greatly changed the way humans spend their leisure time and entertainment. The world of adolescents is not immune from these changes and one of the manifestations of this change and transformation is the change in the type of games of this section of society, which can be seen in the emergence and expansion of computer games. Simultaneously with the emergence and prevalence of these games, many researchers, educators and parents have become curious about this phenomenon and have explored the positive and negative effects and consequences of computer and video games. In this case, the focus is on the two main elements of this relationship; That is, it has been teenagers and computer games (Farrokhi et al., 2015). Playing for kids is like living for adults. In their games, they learn about life and in the games, they learn how to deal with others, and at the same time, they show their feelings towards those around them. Computer games have a great impact on the creativity of people, especially children and adolescents. Much research has been done on the impact of

computer games on the creativity of children and adolescents. Due to the growing trend of using computer games, new capabilities are constantly being added to these games and human beings demand new functions from them. In the meantime, having creative thinking leads to discovery, problem-solving, innovation, and success in individual and social life, and ultimately will play an important role in the satisfaction of personal and social life. In addition to the impact of individual characteristics and external factors such as games in developing abilities, it should not be forgotten that the student as a member of the family and community play these games need resources and support that can be done in activities. And the use of technologies to create an important impact (Rashidi & Sharifi Alounabadi, 2016). Play, as well as being a means of entertainment, has an educational and constructive aspect and has had a serious impact on people's lifestyles (Hassani & Mohammadi, 2019). Human life today has changed dramatically compared to centuries and millennia ago. Due to its social, educational, economic, and cultural complexities, this type of life requires special skills, among which high-level thinking can be mentioned. So far, different types of high-level thinking have been identified, among which creative thinking can be found. And pointed to critical thinking (Miri, David & Uri, 2007). Computer games can be considered a source of learning as well as entertainment, and in this way, children have developed generalized strategies for learning to learn. Which improves spatial visualization and increases the subjects' mental abstract skills (Squirck, 2006). Due to the flexibility in accessing a variety of programs, self-dynamics, rich content, and the ability to meet the needs of learners, much attention has been paid to understanding the types of games in educational systems (Zofan and Lotfipour, 2001). They are interactive software programs created primarily for entertainment purposes. The so-called computer games refer to PC-based games and command games. Computer games are a type of game that is used through computer technology (Tang et al., 2009). It is a cognitive activity that can lead to the development of cognitive, perceptual, and motor processes (Delbari, Mohammadzadeh, and Delbari 2009). It is a kind of interactive entertainment in a simulated environment. Or virtual, which is done by computer devices equipped with a processor (Panahifard, 2010). This type of game can be used as interactive content in scientific fields and help learning. In computer games, users are attracted for non-educational reasons. They play but learn learning skills while playing (Green et al., 2003).

One of the most important aspects of thinking is a high level of creativity. Creativity and innovation are one of the highest and most complex mental activities that human beings should pay attention to (Hosseini, 2011). Creativity is a concept related to differences in individuals. This concept has been developed to explain why some people have a greater ability to come up with new solutions to problems (Jauk & et.al, 2013). Today, psychologists believe that creativity is not innate or innate, but can be acquired. Through education, children can be taught to think of unusual solutions and through divergent thinking examine their problems and achieve appropriate solutions (Parsamanesh and SobhiGharamaleki, 2013). The creation of new thoughts, ideas, and concepts is always the basis of inventions, discoveries and the emergence of appropriate ways to solve problems in human life. The advanced and civilized societies of the past and present have constantly paid attention to the value and importance of this aspect of human mental and intellectual abilities and have sought to strengthen it, and through this, have achieved development, prosperity, progress and happiness. In today's complex world, where we are witnessing intense competition from different societies for the latest technologies and sources of power, talented, creative people, and owners of new and innovative ideas, like the most valuable assets, from a very high and valuable position. According to Toyenbee, the chance to gain potential creativity can be the subject of the life and death in any society (Hemmati, 2008). Because computer games have challenging, problem-solving environments, they stimulate students' creativity (Roe &Muijs, 1998). To win and achieve the desired result in computer games, players must identify potential challenges and think about them to be able to solve them. Therefore, according to the processes in these games, computer games are an important source of adolescents' creativity and they can develop their creativity by having fun with these games (Khalifa et al., 2011). Some experts in sports science have mentioned concentration activity as the most important factor in performance success (Sanchez, X., &Torregrosa, 2005) and some emphasize the importance of that skill (Schweizer, 2006). Regarding the importance of concentration skills, some other experts such as Mikulas (2002) believe that poor concentration skills disrupt reading activities, drowsiness, loss of control, mental confusion, and poor hearing skills. In the above confirmation, the results of

Brumback, (2000) showed that people who had low scores on the attention stability test faced serious and major problems in various activities such as reading, listening, and analysis. In this regard Friedenberg, J & Silverman (2006) believe that the ability to focus depends on factors such as commitment, desire to do homework, homework skills, emotional state, physical state, psychological state and environment. It should be noted that a person's range of concentration is limited at the beginning of school entry and develops over time (Pickering, 2006). Focus is said to be the ability to direct desirable thoughts with intent, sometimes as a cognitive effort (Schmidt-Atzert, Buettner &Buehner, 2004) and sometimes as a way of working (Westhoff, & Hagemeister, 2005) and is thought to facilitate the speed and accuracy of the individual in performing the task. The institution of the family in today's world is widely experiencing divorce. Family changes and rising divorce rates in Iranian society have also raised social concerns. The issue of divorce is especially important because of the consequences such as depression, aggression, academic failure, delinquency, social development that lead to divorce for children and affect their future. Divorce, in addition to having a significant impact on couples and will affect their future, affects the behavior and performance of children and puts more pressure on girls than boys (Azad and Rezaei, 2016).

Decrease children's mental concentration and increase the likelihood of learning disabilities, especially in courses that require thinking and reasoning; It is one of the consequences of parental separation. According to statistics, academic failure, especially in reasoning courses, disruption of social and emotional interactions, and an increased risk of problems such as anxiety and depression up to two years after parental separation, threaten the mental health of children more than ever. Divorce is not the end of life; Rather, the end of the marriage is a failure. Among these, the main victims are children and adolescents who face many problems with the breakup of their families. As much as living in a stable family, free from turmoil can help children and adolescents to develop better, so much the difference between parents and especially their divorce and separation from each other, many harms. It enters the body and mind of children. The effects of these traumas are such that children of divorce face serious problems in social, cultural, and educational interactions and are sometimes even drawn into dangerous vortices such as addiction (Yasa, 2019). Educational computer games have a great impact on the creativity of people, especially children and adolescents. Much research has been done on the impact of computer games on the creativity of children and adolescents. Due to the growing trend of using computer games, new capabilities are constantly being added to these games and human beings demand new functions from them. In the meantime, having creative thinking leads to discovery, problem-solving, innovation, and success in individual and social life, and ultimately will play an important role in the satisfaction of personal and social life. In addition to the impact of individual characteristics and external factors such as games in developing abilities, it should not be forgotten that the student as a member of the family and community to play these games need resources and support that can be done in the activity. And the application of technologies makes a significant impact (Rashidi et al., 2016). Creativity is a new and useful idea or solution that has three components: specialized knowledge and innovative thinking skills and motivation (Chen et al., 2018). Today, psychologists believe that creativity can be acquired. Through education, children can be taught to think of unusual solutions and through divergent thinking examine their problems and find appropriate solutions (Parsamanesh et al. 2013). Studying the vast developments in the last two decades of the twentieth century is a sign of creativity, as the essence of all socio-economic and technological processes, which has profoundly changed the foundations of educational systems, to change educational systems from providing mere programs Education towards creative thinking training programs has been accompanied by changes in content and teaching methods (DeFillippi, Grabher& Jones, 2007). During his research on the role of the power of differentiation and reasoning in human life, Professor Mathiolipman concluded that many students and even students lack the power of correct reasoning and judgment, which is the result of not teaching them to think and reason in It is childhood, so he designed a new program called teaching philosophy to children to improve children's thinking and reasoning and introduced it to schools (Gholami and Karimzadeh, 2011). Given the importance of this issue, the growth of creativity is one of the important goals of any country and various educational systems in the world are looking for ways to increase and grow the creativity of students. According to research, computer games are one of the most important sources

of development of the creativity of children and adolescents (Kooli& et. al, 2019; Abadli & Otmani, 2014; Lee, 2005).

Computer games due to their emergence and the position it has found today among different age groups, and since they are one of the first gateways for children and adolescents to enter the world of information and communication technology and gain computer skills; Studying about them is important. Computer games are no longer the only means of entertainment and have found scientific and educational applications. With this background in mind, the goal that can be attributed to this research is that this industry has largely educational implications; They also have significant effects on educational computer games due to features such as relative benefits, competitiveness, and some degree of complexity to be tested and challenging. Computer games have aroused different opinions about themselves since they entered the world of children and adolescents. Some people consider computer games to be suitable and important for children and adolescents, and these games are considered to cause the development of many cognitive skills, including the development of creativity, and some, on the contrary, consider these games as nothing but a waste of children's time. They do not know and consider these games to have negative effects and lack creative issues for children and adolescents. Undoubtedly, equipping parents and teachers with the necessary guidance in this field requires a lot of research in the field of computers and computer games. Computer games have challenging, imaginative, and problem-solving environments. Therefore, it must be determined what effect these games have on the creativity and concentration of students, especially children of divorce. Given what has been said in the current information age, students' intellectual skills are not enough to face complex issues. This puts a lot of emphasis on conservatism, and less attention to modernity, creativity, and foresight in our way of teaching. While it does not emphasize the way of knowing, learning, developing the power of cognition, the ability to recognize the environment, analysis, and critical thinking. However, there is a need to teach skills such as creativity and focus to solve problems, solve life problems, and maintain students' health. One of the tools of information and communication technology that has had a great impact on teaching and learning is the use of various computer games. Researchers have not done much research on the effect of different types of computer games on creative thinking and increasing concentration in children of divorce, so considering that creativity is considered a cultivable talent and the use of Educational and non-educational computer games is inevitable for students. Also, children of divorce are among the most vulnerable students in school and society and should be given more attention than others. The present study seeks to find the answer to this question. Do brain teasers affect creative thinking skills and increase concentration in children of divorce?

Research hypotheses

Hypothesis 1: Brain teasers affect creative thinking skills in children of divorce.
Hypothesis 2: Brain teasers affect the children of divorce.

2. Literature review and hypothesis development

At home and abroad, research has been conducted around the variables of the present study, some of which are mentioned below:

Findings of Rashidi et al. (2016) Based on the results showed that There is a direct correlation between the use of computer games and creative thinking, but there is a significant inverse correlation between perceived social support on the family scale and the use of computer games.

The Findings of Mirani Sargazi et al. (2019) showed that educational computer games strategy has a significant effect on creative thinking and interactive strategies. Based on the findings, it can be stated that the use of computer educational games can be an important tool to increase creativity and social interactions in children and adolescents, which in turn has a wide impact on life and social and individual skills in individuals.

The results of Hassani et al. (2017) showed that computer affect on two components of creative thinking, namely flexibility and expansion. While there was no relationship between the two components of creativity and fluidity of creativity and computer games.

The Findings of Farrokhi et al. (2015) showed the effectiveness of using strategic computer games compared to leisure computer games in creativity and its three dimensions (fluidity, flexibility, and expansion) but in terms of initiative, there is a difference in meaning. Darmian of the two groups was not observed.

The results of this study showed that strategic computer games are more useful than recreational computer games in developing students' creative thinking, so it is recommended that administrators, principals, teachers, and parents play strategic computer games for knowledge. Students recommend.

The research of Khalifa and Ebrahim Nobandegani (2011) showed that there is a significant difference between creativity and performance of students in proportion to the experience and duration of playing computer games.

The Findings of Esmaili et al. (2017) showed that computer games had a significant effect on improving the critical thinking of students in the experimental group compared to students in the control group. The results showed that computer games improved the critical thinking of the experimental group. Has forgiven.

Lee (2005) also concluded in his research that computer games contain creative and challenging issues that attract children and adolescents and even many adults and make them spend a lot of time with these types of games. He also believes that engaging in these games helps students' high levels of cognitive skills such as problem solving and creativity.

Zaparyniuk (2006) also found in a study that the scores of cognitive and problem-solving skills in children who played computer games were significantly higher than the scores of children who did not play these games. He goes on to say that computers and video games are a useful tools in developing cognitive and problem-solving skills in children.

Chen et al. (2018) concluded that educational mobile and computer games are effective in interpersonal relationships, self-efficacy, self-control, and individual interactions. The prevalence and duration of playing mobile games were higher than those playing computer games among medical undergraduate students in Chongqing, China. This study determined the interpersonal relations, self-efficacy, self-control, and expectation of the students at the time of playing computer and mobile games. Future studies may consider studying the interaction among game-related behaviors, environments, and personality characteristics.

3. Research methodology

The present study, which aimed to investigate the effect of intellectual computer games on creative thinking skills and increase concentration in children of divorce, is applied in terms of purpose and is among the controlled randomized clinical trials. First, using a simple random sampling method of the available type and among all 7 to 10 year old divorce children in Zahedan located in Iran, 40 boys were randomly selected as the sample. We chose boys as an example because jumping thoughts and lack of concentration occur more strongly in boys than in girls. Also, our access to the boys 'sample was easier than the girls'.

After matching the result of the pre-test of the Creative Thinking Questionnaire and Concentration Assessment, the present sample was replaced by a simple sampling method by drawing lots in two groups of 20, experimental and control; In the first stage, the intellectual computer educational games available in the market were identified and then, among them, the intellectual computer educational games that were most appropriate for the research variables were selected. The method of implementation was such that after the necessary coordination with the identified schools and centers

and the justification of the principal, teachers and educators in using the research plan, first both control and pre-test groups were taken from the social skills questionnaire and increased concentration. Then, the children in the experimental group were exposed to intellectual computer educational games for One Month and 7 useful sessions, each session lasting 1 hour. The students in the control group played in the usual way during this period. In the end, all members of both groups were re-evaluated by post-test. All ethical and clinical criteria were fully observed and controlled in all stages of the implementation of the research plan.

Measuring tools

To measure the increase in children's concentration from the standard questionnaire of mindfulness of Baer et al. (2004) and to measure creative thinking from the Creative Thinking Questionnaire Welch.D.& Mc Dowall.J (2010), was used.

Creative Thinking Questionnaire

The Creative Thinking Skills Assessment Questionnaire was used to measure the level of creative thinking in students. This questionnaire is translated from an English language tool that has not been implemented in Iran so far and requires validation (validity and reliability assessment). However, Welch.D. & Mc Dowall. J (2010) reported the validity of this questionnaire as desirable and stated that its reliability was above 80% according to Cronbach's alpha. The Creative Thinking Questionnaire has 20 questions, the scale of which is a five-point Likert scale. Cronbach's alpha coefficient for measuring the reliability of the questionnaire in the present study was 0.90.

Mindfulness Questionnaire

The Five-Dimensional Mindfulness Questionnaire (FFMQ) is a five-dimensional assessment tool developed by Baer et al. (2004) to assess the following:

Observation: means be able to be aware of our feelings, thoughts, and mental images. This aspect refers to the extent to which we can feel and observe our inner and outer worlds.

Description: It means whether we can name our feelings and experiences and express them.

Conscious action: Can we be present at the moment and be aware of it when we do something?

Internal experience without judgment: How much can we accept our inner experiences, feelings and thoughts, and not judge?

Lack of reaction: How much we can not react to negative thoughts and feelings.

This test has 39 questions that are measured based on the Likert scale. In the present study, a short form and 20 questions of this questionnaire were used. Cronbach's alpha coefficient for measuring the reliability of the questionnaire in the present study was 0.89.

Brain teaser game

Among the computer educational games available in the market; The computer game that had the most correlation with the research variables was selected. After collecting the data, following the data distribution from the normal distribution was examined by Shapiro-Wilk test. For data analysis, the comparison between the two groups was analyzed by analysis of covariance and changes within each group by dependent t-test. Data analysis was performed using SPSS software (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY, USA.).

4. Results and discussions

In the present study, the distribution of research variables for the experimental and control groups, based on central indicators and dispersion is as follows:

Table (1) Central indicators, dispersion and distribution of variables studied in the study in the control group (processed data, 2021)

Variables		Number	Average	Standard deviation	lowest amount	maximum amount
Pre-test focus	control	20	33.6000	6.27778	27.00	54.00
	Test	20	34.8000	5.84538	25.00	45.00
Concentration after the test	control	20	31.5000	4.71839	21.00	39.00
	Test	20	87.5500	10.09677	66.00	100.00
Creative thinking before the test	control	20	34.2000	6.91756	27.00	54.00
	Test	20	35.0500	5.82621	27.00	49.00
Creative thinking after the test	control	20	32.1500	4.52217	22.00	39.00
	Test	20	86.1000	9.56914	70.00	100.00

As can be seen in Table (1), the highest mean belongs to the experimental group in the post-test of creative thinking and concentration (86.1000 and 87.5500). Also, the mean of the control group did not increase much.

Table (2) Test (Kolmogorov Smirnov and Shapiro Wilk) Research variables (processed data, 2021)

Variables	Kolmogorov-Smirnov test statistics	significance level	Shapiro Wilk test statistics	significance level
Focus	.099	.200*	.982	.953
Creative Thinking	.148	.200*	.952	.528

As can be seen from the data in Table 2, the significance level of the Kolmogorov-Smirnov and Shapiro-Wilk tests for all variables is greater than 0.05. As a result, these variables studied in the present study have a normal distribution and parametric tests can be used to prove the research hypotheses.

Levin test was used to examine the same variances. According to the table below, since the level of significance for all research variables in Levin test is more than 0.05; Therefore, with 95% confidence, the condition of equality of variances is established and we are allowed to use analysis of covariance.

Hypothesis 1: Brain teasers affect creative thinking skills in children of divorce.

Table (3) Results of analysis of covariance(processed data, 2021)

Source	Total average squares	Degrees of freedom	average of squares	F	Significance level
Corrected model	28585.694[a]	3	9528.565	199.584	.000
group	1962.289	1	1962.289	41.102	.000

Pre-test creative thinking	288.596	1	288.596	6.045	.019
Error	1670.973	36	47.742		
Total	162965.000	40			
Corrected model	30256.667	39			

Hypothesis 2: Brain teasers increase the focus on children of divorce.

Table (4) Results of analysis of covariance(processed data, 2021)

Source	Total average squares	Degrees of freedom	average of squares	F	Significance level
Corrected model	29955.935[a]	3	9985.312	163.326	.000
group	974.112	1	974.112	15.933	.000
Pre-test focus	55.152	1	55.152	.902	.349
Error	2139.808	36	61.137		
Total	165505.000	40			
Corrected model	32095.744	39			

According to the table above, it is clear that a significant level with a value of f = 15.933 is less than 0.05 (p = 0.000), so it is concluded that intellectual computer games have an effect on increasing concentration in the children of divorce, and this the hypothesis is confirmed. It should be noted that the intensity of the impact is equal to 93%.

5. Conclusion

Nowadays, with the change of lifestyle and the expansion of apartment living, children have been deprived of playing active games to some extent. However, with the development and popularization of electronic devices such as computers, more advanced games have become popular. One of these games is a computer game, which requires fast information processing and providing logical and extremely fast answers. The results showed that intellectual computer games affect increasing concentration and creative thinking in children of divorce.

The results of this study are based on the findings of Rashidi et al. (2016), Mirani Sargazi et al. (2019), Hassani et al. (2015), Farrokhi et al. (2015), Khalifa and Ebrahim Nobandegani (2011), Esmaili et al. (2017), Chen et al. (2018), Lee (2005) align.

Studies have shown that children and adolescents who are in a happy mood and are emotionally and mentally healthy naturally show a lot of effort and curiosity to understand various issues and usually have good academic progress. However, children and adolescents in divorced families are not interested in school and their dropout rate is quite obvious. These children become extremely aggressive and irregular after their parent's divorce and are less able to control their emotions, feelings and behaviors. At school, like at home, they behave more irrationally than children, and adolescents in normal families, and as a result, their motivation and learning decrease (Taheri et al., 2019) Computer games somehow engage the student in a new exploratory situation. This type of game has positive effects on problem solving, thinking, creativity and creativity of students, and on the other hand, by providing fun and entertaining virtual environments for families, it has become a kind of leisure

entertainment and the necessary support in the field. There are no computer games on the part of the family, and the published negative consequences of games such as academic failure, aggression and virtual addiction, etc., have led to the neglect of the benefits and increasing capabilities of these games in developing students' abilities, including creative thinking (Rashidi et al., 2016). One of the most important things in many computer games is that they are purposeful. In a computer game, people's skills such as accuracy, speed of action, critical thinking, etc. are challenged. Also, these games increase the diversity and richness of games for children and adolescents and contribute to the development of these skills by providing various methods of critical thinking (Esmaili et al., 2017). Computer games provide an attractive and enjoyable environment for the user due to their attractiveness, simultaneous use of multiple senses, and interaction with the user; So many users play these types of games spontaneously and with great enthusiasm. Also, because of the ability to repeat and respond quickly in this environment, there is no fear of punishment and freedom of action during the game, the motivation of students to play these games is very high. Also, due to the spread and application of computer games among children and adolescents, such games can interfere with students' scientific and academic performance by creating a more attractive atmosphere compared to homework (Gunther, translated by Pourabedi, 2003).

Computer games are a mental and cognitive activity that leads children to reach high levels of thinking and increase their concentration and creative thinking. Another use of mind games is in teaching and learning, especially for single parents and divorced children who have less concentration. Therefore, due to the high desire of children to play computer games, these games can be used to promote the level of creative thinking and increase concentration in children. Also, in choosing the type of game, we must pay much attention to the level of children's ability. According to the process of intellectual computer games, these games can be the most important source of thinking, creativity and concentration in children. However, the purpose of this issue in this study is in the first place the shortcomings that exist in the field of research in Iran and also the lack of attention to play therapy in the teaching-learning process, which is probably due to the lack of necessary research. And has been used in the field of intellectual computer games and their use.

5.1 Limitations and study forward

One of the most important limitations of the present study is that due to lack of time, researchers did not have enough time to perform follow-up tests to sustain the impact of intellectual computer games**.**

5.2 Suggestions

The purpose of this issue in this study is initially the shortcomings that exist in the field of research in Iran and also the lack of attention to play therapy in the teaching-learning process, which is probably due to the lack of necessary research. This is probably due to the lack of applied research on the use of educational computer games. Therefore, it is recommended that administrators, principals, teachers and parents prioritize playing intellectual computer games for children in the process of teaching and learning and fostering creativity and increasing their concentration. It is hoped that by conducting more such research, therapists and educators will become aware of the greater power and influence of technology and will be able to make the most of the positive aspects of this powerful tool in treatment and education

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