




The Effectiveness of Game-Based Creativity Training on Social-Emotional Skills of Students

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ABSTRACT

Objective: Nowadays, creativity and play development is one of the main pillars of educational systems for appropriate decision making and problem solving. The aim of this study was to investigate the effectiveness of game-based creativity training on social-emotional skills of elementary school students.

Methods and Materials: This study was a quasi-experimental study with pretest-posttest design with two experimental and control groups. The statistical population in the quantitative part of the study included students of elementary school girls and boys in district 1 of Tehran in 2019 at the ages of 7-9. Data collection tools was Emotional-Social Competencies Questionnaire (2012). univariate analysis of covariance and SPSS.18 software were used to analyze the data.

Findings: The results showed that game-based creativity training protocol had an effect on the emotional and social skills of children in the experimental group and significantly increased those skills ($F=11.20, P<0.001$).

Conclusion: It can be concluded that the use of game-based creativity training protocol in elementary children helps to promote the social-emotional competencies of elementary students.

Keywords: *creativity, play, social-emotional competencies, social skills, emotional skills.*

1. Introduction

The idea of creativity has been discussed and analyzed for a long time. It is human nature to engage with original ideas and new products. When examining the definitions presented in the literature, two points are clear. First, that creativity definitions are heavily influenced by the social context of the time, and second, that creativity definitions value it for the benefit of the individual or society

as a whole. Exploring previous definitions can provide a better understanding of the role of creativity in children's lives (Radanovic, 2020). Definitions of creativity change over time and reflect the values that individual authors have. The position of each interpreter is shaped by assumptions they have politically and philosophically about humans and society (Beghetto, 2010). It should be noted that children are born creative, but the creativity of many of them declines around the age of ten, which can be attributed to formal and

informal educational environments that neglect dynamic and creative education and upbringing, especially in preschool and elementary school ages (Dere, 2019).

Torrance (1996), one of the most famous theorists in the field of creativity, says, "I have seen evidence in my 15 years of studying and teaching creative thinking and working with children that shows that creativity can be taught" (Beghetto, 2010; Torrance, 1966). Having creative thoughts is a factor in personal and social progress, and educating individuals who can deal with multiple problems based on creative thinking to solve them is the ultimate goal of developing societies (Kim et al., 2010). In today's era, students need to improve their critical and creative thinking skills to make appropriate decisions and solve complex social problems in the third millennium. They need to increase their research skills, problem-solving skills, and spirit of inquiry. It is clear that to achieve these goals, a heavy responsibility falls on educational centers, especially education and training. These centers are responsible for teaching knowledge and equipping students with the information they need, as well as providing a platform for nurturing creativity and innovation and using this talent and ability properly and purposefully (Rotaru, 2020).

Play is essential for the overall health and growth of all children. Since play is a prerequisite for learning and a means of nurturing child growth, children learn to listen, follow instructions, respond to game instructions, make decisions, and develop their skills through play. Children can track the results of their behavior during play, express their views and feelings. They can imagine their desires coming true and overcome their worries and anxieties (Rotaru, 2020). Therefore, playing is also considered as a way to foster creativity. Play is a multidimensional process that serves the evolution and growth of the child and leads to social development and improvement of the child's communication skills (Jafari et al., 2014). Without a doubt, play is considered the best natural activity for any child. Generally, any purposeful physical or mental activity that is done individually or in groups and meets the child's needs for enjoyment and persuasion is called play. Children are creative in play and there is significant empirical evidence to support the relationship between play and creativity (Mehta et al., 2020).

According to Libman (2001), the importance of play in children's cognitive development has been repeatedly confirmed. In fact, children's tendency to play or play games is related to creative thinking skills. Play enhances flexibility and problem-solving skills necessary for creativity (Libman,

2001). Singha et al. (2020) believe that playing in childhood leads to increased creativity in adulthood, but it is also difficult to scientifically prove it. However, he argues that play and creativity have a significant impact on children's mental health and should be nurtured and strengthened throughout their lives, and this is a fundamental educational activity (Singha et al., 2020). Young children need to play, and in most cases, fostering children's creativity is as simple as ensuring they have time and space for it. Playing leads to emotional readiness and physical readiness in children for learning and acceptance. Play can be understood as a common communication project, a kind of mutual understanding, between adults and children (Pursi, 2019). Therefore, playing evokes emotions that help children explain their imaginative situations more (Colliver & Veraksa, 2019). Play enhances flexibility and problem-solving skills necessary for creativity (Pourshahriar & Hashemi, 2017).

In a changing world in the age of knowledge and information explosion, equipping students with more complex cognitive abilities is not enough for them to play their social role. Rather, the transformation of emotional and behavioral skills is also essential for effective action (Dadsetan et al., 2010). According to the theory of social information processing, motor experiences play a significant role in social development (Emarati et al., 2012). Based on the research conducted, there is a relationship between creativity and social skills (Erbay & Doğru, 2010; Jamali et al., 2019; Libman, 2001). Social skills are acquired adaptive behaviors that enable individuals to have mutual relationships with different people, show positive reactions, and avoid negative consequences (Ahmadi & Moeini, 2015).

In addition, the relationship between emotional states and creativity has been demonstrated (Maleki, 2016). Recent research has shown the role of emotions in childhood in relation to creativity, parent-child relationships, and later in education and career choices. Creativity is a process in which efforts are made to develop potential talents, and the ability and motivation to achieve readiness and strive for goals are necessary. If a person has good emotional understanding, they can benefit from mood changes and emotional understanding and use it to manage and cope with emotions (Janati et al., 2011). Social and emotional skills are a set of abilities that increase adaptability, positive and effective behavior. As a result, individuals are able to accept their social role responsibilities without harming themselves or others and face daily challenges and problems effectively (Habibi-Kaleybar et al., 2019).

It should be noted that due to the importance of creativity, social and emotional skills in today's social life and the acquired nature of these skills, the issue of nurturing these skills in childhood is very significant. In the process of becoming social and developing creativity, many institutions and organizations play a fundamental role. One of these institutions is educational institutions such as schools, which have a significant impact on the growth of student skills, including creativity, social and emotional skills. Although many scholars and experts in related fields acknowledge the importance of social growth and cognitive development of students, they sometimes do not show interest in tasks outside their formal duties, which can have irreparable consequences. Given the above discussions, the main question is what indicators and components should be included in a creativity protocol based on play for elementary school students, and can this protocol be effective in improving the social-emotional skills of elementary school students?

2. Methods and Materials

2.1. Study Design and Participants

The present study was a quasi-experimental study with a pre-test-post-test design with a control group. The statistical population of the study included elementary school students in district 1 of Tehran in 2019. Due to the diversity and scope of schools and students, a multi-stage cluster sampling method was used. In this study, two schools were randomly selected from district 1 of Tehran's education and training organization, and then several classes were randomly selected from each school. Finally, 30 students aged 7 to 9 were selected and randomly assigned to the control and experimental groups, and then the effects of the developed game package on creativity enhancement were examined for validation purposes. In this section, given the empirical nature of the research, the sample size was estimated at 15 people for each group using Cohen's table for a test power of 0.8 and $\alpha = 0.05$.

Initially, theories, sources, and Persian and English research on creativity and play were studied, coded, and analyzed to create the design of this educational package. Interviews with creativity, play, and psychology experts were also added to the analysis. Based on the results of the analyses, tools that had the ability to create fluidity, flexibility, initiative, and expansion were used to design and build the games. To determine the effectiveness of the game-based creativity-based educational package, a pretest was

taken from the research sample before the intervention. Then, the students were randomly divided into two groups: the experimental group and the control group. The experimental group received creativity education using the educational package. The education was conducted in 10 sessions of 60 minutes each. After each session, the students practiced and received homework at the end of each session. Finally, after conducting the training and completing the exercises, relevant tests were administered from both the experimental and control groups, and the findings were analyzed.

2.2. Measures

2.2.1. Social-Emotional Competence

Social-Emotional Competence Questionnaire: This questionnaire was designed and developed by Zhou and Ji (2012) to measure social-emotional competence in students. The questionnaire consists of 25 questions and includes five components: self-awareness, social awareness, self-management, relationship management, and responsible decision-making. The Likert scale with six options is used to measure social-emotional competence in students, with questions such as "If someone is sad, angry, or happy, I know what they are thinking." In Iran, the reliability of the questionnaire was examined using Cronbach's alpha coefficient and test-retest method, and its factorial validity was determined using confirmatory factor analysis. The results showed that the questionnaire has an acceptable internal consistency and Cronbach's alpha coefficients range from 0.77 to 0.80 for its subscales. The validity of the questionnaire was also confirmed through test-retest reliability with a coefficient of 0.86, which was statistically significant at $p < 0.001$. Factor analysis was also used to determine its factorial validity, and the results of confirmatory factor analysis indicated that the questionnaire's structure fits the data well, and all goodness-of-fit indices confirm the model's fit (Habibi-Kaleybar et al., 2019).

2.3. Intervention

2.4. Game-based Creativity Training

The game-based creativity training protocol was developed as a researcher-made protocol. In the first step of developing this protocol, the researcher reviewed theories, reference books, and previous studies. Then, the researcher conducted interviews with experts in the field and analyzed

the results of these interviews. Based on the results of the interviews, the game-based creativity training protocol was

designed. The protocol was taught in 12 sessions of 90 minutes each (Table 1).

Table 1

Game-based creativity training sessions

Session	Objective	Content
1	Introduction and acquaintance	Introduction, setting initial communication, stating intervention goals and number of sessions, brief overview of the general framework of sessions.
2	Creating internal and external stimuli and capabilities	1- Presenting games that help students utilize their internal stimuli and develop their internal abilities (motivation, internal tendencies, and capabilities). 2- Presenting a game where students change shapes using various shapes to solve puzzles.
3	Designing and presenting creative games	Presenting a game where students change shapes using various shapes to solve puzzles.
4	Informal and unplanned teaching for playing	We introduced a "student guidance" program where we provided guidance and training to students on specific topics or skills. This strengthens creativity and creates a sense of socialization among students.
5	Observation-based and experiential teaching for gameplay	Creating a learning experience in which students can observe various real-life scenarios and concepts and interact with them.
6	Indirect teaching and free exploration	An interactive treasure hunt is organized in which students must solve puzzles to open clues that lead to the final prize.
7	Designing a game-like environment	Creating a game space inspired by mathematics and puzzles that provides students with the opportunity to solve puzzles. Designing a rich game space with intense textures, sounds, and different scents to stimulate children's senses and encourage student play.
8	Subjective environment making	Creating a game space inspired by adventure and strategic thinking that encourages students to engage in various adventures and solve more complex problems.
9	A calming environment and a suitable space for interaction	1- Using calming colors such as orange, soft blue, and mild green in classroom decoration can create a sense of security and greater freedom for students. 2- A conversation room was created where students can gather and interact with each other after group activities.
10	Training skills and cognitive stimulation	1- Presenting a game where students take on the roles of historical or fictional characters and make decisions and face challenges that require the use of educational knowledge and skills. 2- "Skills Exchange" event led by a student has been organized, where students could teach each other unique talents or hobbies and turn it into a fun, interactive learning experience.
11	Incorporating learning and fostering creativity	1- Selecting an online game where students can share their experiences in the game. This promotes learning, collaboration and problem-solving skills while learning various subjects. 2- Creating creative spaces in the classroom with art materials and games to encourage students to use their creativity to solve problems and generate new ideas.
12	Summary	Explanation and review of creative problem-solving and responding to questions and concerns.

2.5. Data analysis

To analyze the data in the second part of the study, version 18 of the SPSS software was used, and the data were analyzed using descriptive and inferential statistical methods. The results obtained from the descriptive data are detailed in chapter four. The Kolmogorov-Smirnov test was used for inferential statistical analysis to examine the normality of the dependent variable. Then, the univariate covariance test was used to examine the effects of experimental interventions on dependent variable.

3. Findings and Results

The total number of participants in this study was 30 children (11 boys and 19 girls). The mean age of all participants was eight years, with a mean age of 6.8 for the experimental group and 7.3 for the control group. The mean

age of boys was 8.8 and the mean age of participating girls was 7.7. The descriptive statistics findings are presented in Table 2.

Table 2

Descriptive statistics findings

Group	Stage	Mean	SD	Skewness	Kurtosis
Exp.	Pre-test	111.8	31.68	0.82	0.58
	Post-test	122.66	25.49	0.84	0.19
	Total	117.23	27.89	0.91	0.65
Control	Pre-test	115.33	37.53	0.25	-1
	Post-test	114.8	32.72	0.31	-1.1
	Total	115.06	35.1	0.28	-1.1

Considering that the skewness and kurtosis values are between 2- and 2+, it can be said that the data distribution in both groups was normal and parametric tests can be used for data analysis. Moreover, Kolmogorov-Smirnov test was

used to examine the normality assumption of dependent variable distribution sizes. This test is considered as one of the normal distribution fitting tests, and with its statistic, it can determine whether data follow a normal distribution or not. Considering that the level of significance in the Kolmogorov-Smirnov test results is greater than 0.05, it can be concluded that the differences are not significant, and it can be inferred that the distribution of dependent variable scores is normal.

To examine the assumption of linearity, the correlation coefficients were calculated between each pre-test and post-test. The Pearson correlation coefficient between pre-test and post-test emotional-social competence was 0.49, which

is significant at the 0.01 level. Given this level of correlation, the assumption of linearity for this variable is also established.

In addition, according to the Levene's test results, the F-value for none of the dependent variable is significant. Therefore, it indicates the validity of the assumption of equality of variances between groups. Considering that the statistical significance level is greater than 0.05, there is no significant interaction between pre-tests and group. This indicates that there is equality between covariates (pre-tests) and dependent variable (post-tests) at all levels of the factor (experimental and control groups), and the assumption of regression slope homogeneity is established.

Table 3

ANCOVA results in summary

Source	Test	Statistics	F	Df hyp.	Df err.	p	Effect size
Group	Pillai's trace	1.13	8.74	1	25	0.001	0.521
	Wilks' Lambda	0.128	11.49	1	25	0.001	0.638
	Hotelling's trace	5.02	16.36	1	25	0.001	0.715
	Roy's largest root	4.09	31.72	1	25	0.001	0.811

As shown in Table 3, all Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root tests are significant, indicating that there is a significant difference between the experimental and control groups in terms of the dependent variable. To investigate the differences, univariate analysis of covariance was performed on dependent variable in ANCOVA context. The results of these analyses are shown in Table 4.

Table 4

Univariate analysis of covariance

Source	SS	df	MS	F	P-value	Effect size
Group	776	1	776	11.2	0.005	0.56
Error	1801	26	69			

The results presented in Table 4 indicate that the one-way analysis of covariance is significant for emotional-social competencies is significant ($F=2.11, p<0.005$), indicating that there is a significant difference between the post-tests of the two groups in dependent variable when controlling for pre-tests.

4. Discussion and Conclusion

The aim of this study was to examine the effectiveness of game-based creativity training on the emotional-social skills

of elementary students. The game-based creativity training protocol improved the emotional-social competencies of elementary students, and the game-based creativity training protocol was effective on the emotional-social skills of the experimental group. Similarly, in the Jamal et al. (2019) study, the effect of stretch games on the creativity of preschool boys and girls was investigated as a specific type of game. The results showed that the susceptibility to creativity from stretch games in boys is more than in girls and, generally, stretch games have a positive effect on increasing the creativity of children. However, the results did not show any difference in the level of creativity enhancement of elementary students based on gender (Jamali et al., 2019). Moreover, the results of the study by Kashani-Vahid and colleagues (2017) have been in line with the results of the current study. The effectiveness of designing and developing an inter-personal problem-solving training program with a creative approach, and its effectiveness in improving the social skills of students, showed that this creative educational package had a positive effect on improving the social skills of students (Kashani-Vahid et al., 2017). In this regard, the game-based creativity training protocol also enhanced the social and emotional skills of children. Similarly, Kiafar and Asghari Nekah (2014) can also support the results of this study. They showed that creativity development programs can

significantly enhance creativity and its components in children. Therefore, given the effectiveness of the program and the results of this research, it is essential to implement such programs to promote cognitive and creative growth at the macro level in preschool centers (Kiafar & Asghari Nekah, 2014). Jafari and colleagues' (2015) examined the effect of game-based teaching on increasing the creativity of preschool children in kindergarten, using a method similar to the current study. The results showed that game-based education significantly increased the flexibility, authenticity, fluidity, and expansion components in creativity in children (Jafari et al., 2014).

In comparison with the findings of previous research, which were mentioned in the previous section, it was found that various studies have examined the effectiveness of games such as Lego, group games, imaginary games, etc. on creativity and social skills. However, in this study, various types of games were used to develop a game-based creativity training protocol. In fact, it seems that games were able to help promote and foster creativity and also improve the emotional-social competencies of elementary school students.

5. Limitations & Suggestions

Based on the findings of this study, the following practical recommendations are suggested for implementation in elementary education: periodic implementation of game-based creativity festivals to promote children's creativity, implementation of game-based teaching methods in various elementary school subjects, protocol-based implementation of games to improve children's psychological health by participating in a healthy game, attention to promoting emotional-social competencies of children in schools, attention to the importance of games in fostering creativity in elementary schools, upgrading the skills of coaches and teachers in using game capacities for creativity development, holding game-based creativity training workshops for coaches and teachers, introducing art to children and understanding its impact and role in human life through game-based creativity training protocol, paying more attention to educational games with environmental themes, emphasis on musical games in schools, and striving to expand the range of games based on artistic activities. The implementation of the current research in different statistical, cultural, geographical, and economic societies, the implementation of the current research for other age groups to control the

moderating variable of age, the possibility of implementing the game-based creativity training protocol on a wider scale, examining the impact of the creativity-based protocol on various aspects of students' success such as academic progress, studying the effectiveness of the game-based creativity training protocol on children's creativity based on their individual and social characteristics. Due to the problems caused by the COVID-19 pandemic and the inability to reach the participants, it was not possible to conduct follow-up tests.

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Declaration of Interest

According to the authors, this article has no financial support and no conflicts of interest.

Authors' Contributions

Both authors made substantial contributions to the research process, covering various aspects from study design to data handling and manuscript preparation.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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