Effect of Educational Games on Concept Development in Children Attending Kindergartens in Shiraz

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Abstract
This research was carried out to examine the impact of educational games on concept development in children attending kindergartens in Shiraz. The study is applied in nature and employs a quasi-experimental methodology using a pre-test–post-test design with a control group. The target population included all children aged 5 to 6 years in Shiraz who were enrolled in kindergartens during the year 2019. A cluster random sampling technique was applied. The instruments used in this study were Vygotsky's Concept Formation Test and the Vineland Social Maturity Scale. The reliability of the tools was validated through the test-retest method, and their content validity was confirmed by experts in the field. Descriptive statistics (mean and standard deviation) and inferential statistics (univariate and multivariate analysis of covariance) were employed to analyze the data. The findings revealed a significant difference in concept development between children who engaged in educational games and those who did not. Additionally, educational games had a substantial positive impact on children's concept development.
Key words: Educational games, Concept development, Kindergartens in Shiraz.

Introduction

Among all educational levels, the preschool stage occupies a particularly crucial and significant position. During this time, the intellectual and mental foundations for children's understanding of various concepts, as well as the development of their physical, social, emotional, cognitive, and creative abilities, are laid. In other words, preschool education acts as the cornerstone and basis for children's future educational endeavors. As preschool is a period where children gain and observe important experiences, these experiences play a vital role in their overall development (Secker et al., 2009).

During the preschool years, children gradually evolve from asocial individuals into social beings,

transitioning from individualistic behaviors to social interaction. During this period, children are prepared for social life in elementary school through cooperation and group activities. The degree of a child's interaction with other children during this stage plays a crucial role in their social

development. Entering kindergarten signifies a significant shift in a child's social life, as their small, family-oriented environment expands into a larger world where peer groups become the central focus. Upon entering this new and broader environment, the child must find their appropriate place — a process that can only happen if they have been sufficiently prepared to adapt to such a setting (Etehadifar, Jahantigh Aval, & Piri, 2016).

A child's exposure to a variety of experiences and activities helps prevent future mental deficiencies, promotes cognitive development, and decreases the likelihood of emotional disorders (Zarrin et al., 2015). Play is as essential for a child's development as good nutrition, love, and protection. It plays a crucial role in children's lives—they engage in play to entertain themselves, learn, grow, develop new behaviors, and explore the world around them. Play is also the primary means through which children express their feelings and emotions; it helps them connect with others. Many of the games children participate in during their developmental years have a lasting impact on their adult experiences. Positive play can shape a child's personality and nurture qualities like humanity, cooperation, and collaboration. Consequently, parents and educators can provide children with a variety of tools and materials that not only entertain but also teach important concepts and values. In other words, play and toys can act as a bridge between the child and their cultural environment, preparing them physically, intellectually, and emotionally for adulthood

(Zare, 2012).

Play undoubtedly serves many functions, one of which is enhancing concept development in children. Between the ages of five and twelve, significant cognitive changes take place. The child's ability to focus mentally continues to improve. They view situations with greater confidence, consistency, and selectivity; their understanding becomes deeper, and they acquire concepts essential for cognitive retention. In other words, preconceptual thinking gradually fades and is replaced by operational thinking, due to the development of reversibility and the ability to connect the physical elements of a situation (Moshtaqi et al., 2012). At this stage, the logic the child develops is logic tied to its concrete context—this is concrete logic. Operations are dependent on the environment in which they are formed; that is, on the physical presence of objects with which the operations are performed. This logic cannot yet be applied universally or in every context. In other words, as long as the child does not touch or manipulate objects, they cannot reason logically, and even in response to simple verbal propositions, they still struggle to form logical reasoning, even at the concrete level (Moshtaqi et al., 2012). Franklin, Pitt, and Lewis (2003) demonstrated in their research that educational games can enhance student learning and encourage active participation in the classroom. Borden and Baird (2006) found that educational games are widely regarded as an effective teaching method, leading to increased

learning and motivation among students (Khezayi & Jamilian, 2014). Ghanaei Chaman Abad and Karshaki (2012), in their study titled *The Effect of Rhythmic Physical Movements on the Intelligence and Social Development of Preschool Children*, showed that rhythmic physical exercises positively affect the social development and intelligence of preschool children. Jafari (2014), in his study *The Effect of Educational Games on the Social Development of Preschool Children*, found a significant difference in the social development of children who played educational games compared to those who did not. Zeynoddini Meymand, Ebrahimi Roumenjan, Nasirfam, and Memari (2015), in their study *The Effect of Kindergarten and Preschool Education on the Development of Children's Conceptualization*, concluded that there is a significant difference in concept development between children who received preschool education and those who were deprived of it.

Promoting children's health through play, along with the use of creative and standardized games in addition to suitable games, is considered one of the primary objectives of kindergartens. Educational games are among the strategies whose role in engaging learners and fostering creativity is a critical and specialized topic in the field of education. An educational game is considered a teaching-learning experience and is an organized activity with specific rules, in which two or more children interact with one another to achieve predefined educational goals. Educational games should not be forced upon children and

must meet certain criteria: first, it should be appropriate for the children's characteristics, needs, and abilities; second, it should focus on enhancing accuracy, concentration, timely reactions, and creativity; third, the activities and behaviors within the game should have logical meaning (sense and significance); fourth, there should be a logical relationship between different parts of the game; and fifth, it should be designed in such a way that it does not overly focus on determining a winner or loser (Afrooz, 2010). In today's modern urban life, numerous limitations have emerged for children's play, to the extent that the nature and style of children's games have changed. Many children, from a young age, become involved in various digital games, which not only fail to achieve many of the objectives of healthy play but also negatively impact children's mental health. Many of the limitations faced by children in modern life—such as physical constraints due to small living spaces, lack of playmates due to smaller family sizes, limited equipment due to economic challenges, and numerous other restrictions—can be compensated for in public play spaces for children. Play is recognized as one of the most important factors in children's development and learning, teaching them social roles and norms, problem-solving skills, language and physical abilities, and helping them adapt to society (Anderson-McNamee, 2010).

A study by Klein and Fritsch (2012) demonstrated that educational games had a significant impact on

four motivational components: attention, relevance, confidence, and satisfaction. Royst and colleagues (2012), in their research, found that 63% of students participated by sharing opinions in class, while 58% took part in organizing and maintaining school discipline. Younger students showed higher levels of participation. Additionally, participation was linked to academic achievement, health, life satisfaction, and overall student well-being. Törn and colleagues (2014), in their research, concluded that children's involvement in group activities and peer play contributes to the development of social growth. Beaudoin, Morsesch, and Ouar (2016), in a study, investigated the effectiveness of storytelling therapy in enhancing social and emotional skills in children aged 8 to 10. The results revealed a significant improvement in these skills among the children.

The Importance and Necessity of Preschool Education

According to findings from psychology and educational sciences, the preschool years are crucial in the development and upbringing of children. During this sensitive and critical period, children learn more deeply, quickly, and easily. Their abilities across various developmental aspects flourish, and the foundations of their personality are formed. As a result, many researchers and educational policymakers emphasize the importance of preschool and primary education, particularly focusing on mother tongue instruction, mathematics, and cognitive-artistic skills. They argue that neglecting the teaching of skills such as phonological awareness—critical for correctly identifying letters and words—general knowledge, a second language, and proper social behavior, can lead to a dislike of schooling and a sharp decline in students' academic performance. Researchers contend that the emergence of behavioral-educational disorders, such as difficulty understanding educational concepts, restlessness and hyperactivity in class, disorganization in completing assignments or personal tasks, truancy, and the need to repeat preschool, all stem from the lack of proper early childhood education. In reality, all children need to acquire the necessary readiness before entering school—or more accurately, before entering society—to be prepared to participate in the community (Mofidi, 2012). Today, efforts are focused on raising awareness among officials, citizens, and the general public about the necessity and importance of education for children under the age of seven, to bring this group out of their homes and into educational settings. By increasing the number of kindergartens and expanding their activities, the opportunity for universal and equal education for all children will be made available to every family (Mofidi, 2013).

When children are treated scientifically and systematically in kindergartens, and these institutions are managed according to specialized plans and programs, they can have a profound impact on the development of the child's

personality. The education and upbringing of children is one of the most crucial concerns today. In fact, one of the key indicators of human resource development is the provision of thoughtful education in kindergartens. If we analyze the impact of this education from the perspective of psychological and educational research, it becomes evident that many social, cognitive, emotional, and spiritual frameworks are formed during this period, which play a fundamental role throughout a person's life. Studies show that children who receive education in kindergartens or preschool centers perform better in several life and social risk factors, such as delinquency, divorce, academic failure, and ethical issues, with a minimum of 20% better outcomes compared to their peers. Moreover, productive indicators such as creativity, goal achievement, independence, sexual identity, adherence to moral principles, and others are established during these early years (Allahyari et al., 2011).

Given the significance of conceptual growth in children, it is crucial to conduct a thorough and detailed examination of educational games and their impact on the outcomes of conceptual development. This process helps to better understand these concepts and identify their specific effects. In this context, the purpose of the present research is to explore the effect of educational games on the conceptual growth of children attending kindergartens in Shiraz.

Research Method

This study is applied in terms of its purpose and employs a quasi-experimental design with pre-test and post-test measurements, along with a control group. The statistical population consists of all children aged 5 to 6 years in Shiraz who were enrolled in kindergartens in 2019. The sampling method used in this research is random cluster sampling. Initially, one kindergarten in Shiraz was selected. From the 5 to 6-year-old children, one class of 30 children was chosen as the experimental group, while another class of 30 children was designated as the control group.

Research Tools

Vygotsky's Concept Formation Test: The purpose of this test is to evaluate an individual's ability to solve problems using abstract concepts. It consists of 22 wooden beads, each varying in color, shape, height, and surface. These beads feature 5 different colors, 6 different shapes, two types of height (short and tall), and two types of surface (small and large). Below each bead are meaningless words. For the tall and large beads, the word "ha" is used; for the tall and small beads, the word "zhaz" is used; for the short and large beads, the word "zim" is used; and for the short and small beads, the word "lush" is used. The examinee must categorize the beads into the four groups mentioned above (without viewing the words beneath the beads). The task is for the examinee to organize the beads based on two characteristics, thereby creating a new conventional concept represented by the meaningless words. Afterward, the beads are turned over, and the examinee is asked to describe

the differences and similarities between the groups. In a typical scenario, the individual should be able to differentiate the beads based on height and thickness. The time taken to complete the test is secretly recorded, and the number of beads turned over is counted. The final score is calculated using the formula: time in minutes + 5 × number of turned beads = score (Jalali & Hassanpour, 2012). In the study by Jalali & Hassanpour (2012), the test's validity was found to be satisfactory, and its reliability was confirmed through correlation analysis. Furthermore, Hashemi et al. (2010), in their study comparing concept formation in deaf and hearing children, calculated the test's reliability using the test-retest method as 0.76. In the present study, the reliability of the scale was reported as 0.731 using the test-retest method.

At the end of the educational games period, concept formation in children from both the experimental and control groups was measured again. After collecting the data, analysis and review were conducted (Table 1).

Table 1: Types of Educational Games Conducted in the First to Eighth Weeks for the Experimental Group

Week	Type of Game	Goal of the Game	Number of players; what is needed	How to Play
First	Whiz Whiz	Whiz Whiz is a great game for children who need to read long lists, such as a series of numbers, the alphabet, or the days of the month.	Ten players or more; play area	Choose a set that you want the children to list, such as numbers from 1 to 100, prime numbers, or any other set of words or numbers they have access to. Decide at which number or letter the "buzzing" will stop. For example, you can decide that every fourth number or letter will be replaced by "buzz." You can also start the game with specific letters or numbers that are divisible by certain values. The word "buzz" will replace those numbers or letters. Children will start reading the items and options they have listed and say "buzz" instead of the selected number or letter. For example: 3, 2, 1, buzz, 7, 6, 5, buzz, 11, 10, 9, buzz, and so on. Anyone who fails to say "buzz" instead of the chosen number or letter will be eliminated from the game. Therefore, "Buzz" is one of the group games in kindergarten that keeps children entertained for hours.

Second	Blind Artist	This game is played in pairs and encourages imagination and the child's ability to describe different things.	Four players or more: a sheet of white paper, pencil or pen, drawing or images.	Pair up the children, but make sure they cannot see each other's faces. Give one of the children a picture or an image. While their friend describes the picture without revealing what it is, the second child should recreate the image, and we need to see how accurately and precisely the drawing matches without looking at the original picture.
Third	Crazy Train	Crazy Train is a suitable game for elementary school children and kindergartners. It's a "whoo-whoo" train plus some fun and entertainment.	Ten players or more: a playing area.	Line up the children to form a "choo-choo" train. Then, announce random commands aloud, such as slow, fast, slow motion, turn right, move backward, and stop, to make the train confused and wild, with erratic movements. Younger children enjoy this game. It is an exciting and engaging group activity for kindergarten.
Fourth	Square	Square is a simple game that can stimulate and excite children, keeping them awake after lunchtime.	Twelve players or more: a room with four corners and enough space for a group of children to stand.	Choose one of the children and blindfold them, then send them outside the classroom for a short period. Divide the rest of the class into four groups of four. Ask each group to choose a corner for themselves, labeling them groups A, B, C, and D. Once the students are in place, "the caller" announces one of the corners, and all students standing in that corner must leave the game. The last four standing members of the group choose a corner, and the game continues until they are eliminated, leaving only one person remaining.
Fifth	Smile	Smile is a memory game that prevents children from using specific words. It's an energizing game that can be played until the end of the day and is also great for reviewing lessons.	Ten players or more: reading comprehension containing various words.	Give the children a list of forbidden words. These could be things like colors (red, blue, green, etc.), play, man, food, apple, and so on. Create a comprehension activity using these words and ask the children to read each sentence aloud. The children must laugh every time they hear one of the forbidden words.
Sixth	Jumping on the Line	It is an energizing game that can be played even until the end of the day and is a great game for reviewing lessons.	10-15 players: adhesive tape or chalk, a set of true or false questions, space for playing.	Draw a straight line using chalk or tape. One side of the line should be marked as correct, and the other side as incorrect. Ask the children to stand on the line. Ask them a question, and if they think the answer is correct, they should jump towards the correct mark; otherwise, they should jump towards the incorrect mark. Children who make a mistake must go back and sit down.

Seventh	Blindfold Conversation	This is an interesting game that encourages children to listen and focus on the voice of another person.	10 or more players: a cloth for blindfolding and space for playing.	Create a space in the room and ask the children to form a circle. Choose one child and blindfold them. They should spin around and point to one of the other children. Whoever they point to must speak to them in a funny and unclear voice without saying their name. If the blindfolded child guesses correctly who the student is, that person now changes places and the blindfolded child must close their eyes.
Eighth	Far or Near Game	In this game, children learn about collaborating with others and realize how enjoyable cooperation and participation can be.	5 or more players: space for playing	Choose one of the children to be the seeker. Send them outside the room while the other children hide something in the room. Ask the seeker to enter the room and find, for example, the hidden blue book. When they get closer to the location of the book, tap quickly on the table, but if they move farther away, make the sound weaker. Continue doing this until the seeker finds the book.

Findings

At the descriptive level, the mean and standard deviation were used as statistical indicators. At the inferential level, one-way and multivariate analysis of covariance (ANCOVA) were used. (Table 2).

Table 2: Statistical Indicators of Children's Concept Formation Growth in Pre-Test and Post-Test by Group

Group	Number	pre-test		post-test	
		Average	Standard deviation	Average	Standard deviation
Experiment	30	57.70	4.907	61.17	4.728
Control	30	57.97	4.605	58.60	4.687

As displayed in Table 2, the mean score for the experimental group in the pre-test is 57.70, while the mean score for the control group is 57.97. In the post-test, the experimental group's mean score is 61.17, compared to the control group's mean score of 58.60, with the experimental group showing a higher mean than the control group.

Table 3: Levene's Test for Conceptualization Growth

Variable		Test Statistic (F)	Significance level
Conceptual Growth	Pre-test	0.142	0.708
	Post-test	0.117	0.734

As shown in Table (3), the significance level of Levene's test is greater than 5%, so the variance in conceptualization growth between the control and experimental groups does not show a significant difference at the 5% level.

Table 4: Results of Analysis of Covariance on Children's Conceptual Growth

Variable	Source of variance	Sum of Squares	Degrees of Freedom	Mean Square	Test Statistic	Significance level	Eta coefficient	Power of the test
Conceptual Growth	Pre-test	1148.456	1	1148.456	478.138	0.000	0.693	1.000
	Group	118.855	1	118.855	49.483	0.000	0.465	1.000
	Error	136.910	57	2.402				
	Total	1384.183	59					

As shown in Table 4 (group row), the eta coefficient for the children's conceptual growth variable is 0.465, indicating that 46.5% of the observed differences in children's conceptual growth are attributable to the implementation of educational games. Furthermore, since the significance level of the test for the conceptual growth variable is less than 0.05, it can be concluded that educational games have a significant effect on children's conceptual growth at the 0.05 level. Additionally, given that the power of the test for the conceptual growth variable is greater than 0.80, the sample size for the study was sufficient.

Conclusion

The results of the study showed that educational games significantly influence children's conceptual growth at the 0.05 level. These findings align with prior research by Franklin et al. (2003), Bornheid (2006), Moshtagh et al. (2012), Jalali and Hassanpour (2012), Zeinaldini Meymand et al. (2015), Nikdel and Nikdel (2016), Goltash et al. (2017), Shahbazi et al. (2017), and Mahmoudi Broujeni and Heydari (2019). It is evident that after engaging in educational games, children's conceptual growth improved, which is consistent with the observations of parents and kindergarten teachers. Repetition of learned concepts through games allows children to reflect on them and derive multiple meanings. Additionally, educational games foster important developmental traits in children, such as accuracy, memory, imagination, and agility, while also enhancing their understanding of concepts like quantity, distance, size, number, and space through direct experience. The learning that takes place during educational games is often acquired willingly and without pressure, creating a positive learning environment. Therefore, offering activities in the form of educational games that stimulate children's interest and align with their desires can have a profound impact on their conceptual growth and overall learning

ability.

However, a limitation of the study was that it did not account for children's personality traits, and the sample was limited to children aged 5 to 6 years in Shiraz. Thus, caution should be exercised when generalizing the results to other populations. Given the significant effect of educational games on conceptual growth, it is recommended that kindergarten teachers focus on the elements that promote children's conceptual development and consider offering retraining courses. Practical workshops centered on educational games could also help enhance children's conceptual growth. Additionally, instructional designers should focus on developing educational games across various fields, and future research could explore the impact of educational games on learning in different subjects to demonstrate their broader benefits for learning, prevention, and control.

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