

Identification and classification of factors that affect the creativity of children from age 3 to the end of 5 in the AHP method

Case study: Kindergartens in district 5 of Tehran Municipality

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ABSTRACT

Contact: In order to have a mighty and dynamic society and human resources efforts should be made to educate the mighty, motivated, and creative human resource and should have enough researches about creativity and different aspects and effects on them. As well as developed societies used creativity and innovation in widespread, it shows their study, knowledge, and recognition of this phenomenon. Target: To identify different factors affecting children's creativity from age 3 to 5 in kindergartens in District 5 of Tehran Municipality and chose the best factor as affect the creativity and classify identified factors based on the emphasis on the AHP method. Method: This research is based on the purpose and the method of data collection descriptive and survey research. The society that we want to study contains 56 kindergartens in District 5 of Tehran which 64 kindergartens were considered as the sample size based on Morgan table. Finding: According to the finding among the 20 identified factors, 10 factors are drawing, using musical instruments, and making a sound, telling a story, reading books, improving curiosity, accepting imaginary friends, touching objects from a close distance, creating space for performance and performing, polling and experimenting with different ways of achieving a goal is more effective than other factors. Conclusion: According to the result obtained by experts of kindergartens The first place is drawing with five indicators (easy to use, attractive, challenging, motivating, and learning) and the second place is the use of musical instruments and making a sound and telling a story is in the third place, and... Also polling and testing different ways to achieve a goal are in the ninth and ten places.

Keywords: Creativity, Factors, Ranking, AHP

Introduction

Childhood is the most important period of human prosperity and the most basic basis for having the health of later life cycles of physically, mentally, and emotionally.

Among these, one of the most important and effective factors of growing comprehensive of children is environmental factors. The experiences that the child gains from his environment during development such as family, kindergarten, school, and university can have a great impact on his personality but with

the very important role that kindergartens play in developed and urban societies and according to how busy are their parents is one of the most influential childhood periods in which many children spend their time in kindergarten and with the different training and activities that take place in it, it creates creativity and mental development in the child.

Experts believe that the personality of every human being is formed in the first six years of life therefore primary years of a child's life are very important in terms of education, training, and shortness of which is harmful. These days, for better growth and development of children, used centers such as kindergartens. The purpose of creating these centers is to help the physical, mental, emotional, and social development of children to help their talents and interests to flourish ultimately (Ghaltash et al. Parsa, 2017).

Creativity and innovation can appear in different parts of human life or a country such as the education system, different industries, and service organizations and etc., cause prosperity, progress, and dynamism of the country and can say that different countries rely on creativity and innovation in different equipment that can increase power.

According to the historical background of economically developed countries, the question asked is why some of the economies have started growth and development later but have reached the level of previously developed countries in a shorter Time? Has the growth rate of these countries been fast or has the growth of the previously developed countries slowed down?

According to economists like Fergberg, Churchill, and Jones; the rapid pace of patent innovation has accelerated economic growth in these countries, and as a result, we are witnessing a kind of convergence in economic growth and development, in the long run, depends on investing and initiatives, inventions, innovations with a specific orientation: Two main factors of leap and economic growth:

First increasing the capacity for creativity, innovation and initiative through investment in R&D and training of the workforce continuously and second, linking this research with the market and needs.

The arrangement of this complex forms the "national system of innovation" and the result of innovations and inventions that cause the "economic leap".

Accordingly, the growth gap between different countries is affected by the difference in the national capacity for innovation (keshavarz et al, 2010).

Examples of research on factors affecting children's creativity include the following.

Internal Research

- Ismaili Kartiji (2015) in an article entitled "Fostering children's creativity" states that creativity as a potential talent needs attention and development, because this ability, like all human abilities, will not be realized except in the shadow of fertility. Therefore, its upbringing should start from childhood and paving the way for its growth is the responsibility of the family, kindergarten and schools. Creativity is one of the highest and most complex activities in the human mind that education should pay attention to. Creativity is related not only to intelligence and thinking but also to the organization of one's personality.
- Hosseini and Sheki (2009) in an article entitled "Study of factors affecting the growth of children's creativity" stating that creativity talent with intensity and weakness exists in all people and it can be educated. Educators need to break down old and traditional frameworks by presenting issues and activities that have more than one solution, and forcing children to open up to questions. Children are valuable assets that, if properly raised, will become a valuable treasure for society. Otherwise, they will be a burden on society.
- Jahanian (2016) in his research entitled "Methods of fostering creativity and its impact on learning" This article seeks to examine the methods of fostering creativity. In this article, creativity and learning are defined and described, as well as the effective factors in creativity and barriers. The findings of this article show that research is a suitable platform for strengthening and expanding the spirit of initiative, innovation and creativity. Teacher as creating conditions and facilitator Students can learn through modernity, flexibility, not forcing students to retain mental accumulation, humor, avoiding stereotyped strategies and teaching methods, paving the way for students to express themselves and increase their self-confidence, stimulate curiosity. Learners and finally combining education with research to teach creativity and foster creativity in children and adolescents.

- Jafari et al. (2014) in a study entitled " The effectiveness of play training on increasing creativity of preschool children in kindergartens " conducted on 32 children concluded that play education has the components of flexibility, originality, fluidity and expansion in creativity in Children increase significantly and conclude that play education is a good way to increase the creativity of preschool children.

External Research

- Castillo Vergara et al. (2018) Research states that in recent years, the issue of creativity has received much attention in educational circles. Increasing the level of creativity today is one of the necessities of education because creativity accelerates the process of individual development of students and affects their position. The purpose of this article was to measure the level of creativity in fifth grade students among 24 educational institutions. Conclusions are based on the fact that there are many differences based on variables such as school type, gender, social and economic conditions on the level of extracurricular creativity. We also came to the conclusion that increasing the level of economic conditions also increases the level of creativity.
- Maria et al. (2018) in a study entitled "Maternal personality traits and their environment in the structure of their children's creativity" state that parents' attitudes and behaviors are very important factors in their children's creativity. Although not very well known, many international movements have been started by parents to develop creativity in their children. Reviewing past studies, we have identified four important factors in shaping the creative atmosphere in the parent-child relationship. To prove our theory, we have used a list of pre-made questions for mothers. Data analysis proves (as predicted) that these factors play a significant role in creating a creative atmosphere at home. Encouraging diversity, encouraging daydreaming, encouraging not to choose easier ways, and supporting creative endeavors Our next achievement is how mothers' personalities relate and create a creative atmosphere at home. Our findings show how freedom of action is the key to creating a creative atmosphere at home.
- Gagnard et al. (2016) in their research entitled "The relationship between intelligence and creativity in gifted and gifted children" state that the interaction between creativity and intelligence has been documented over the decades. However, there is currently no agreement on how these structures will relate. The study included 338 children, including 118 students with an IQ above 130 and 220 children with an IQ below 130. This study states that a weak correlation was found between intelligence and creativity. However, children's high verbal abilities (verbal self-confidence index ≥ 130) showed more significant scores in verbal tasks.
- Ebrahimi Moghadam et al. (2016) in their research entitled "Increasing the factors of creativity done by Iranian parents" state that most parents are not very skilled in parenting and have a neutral role in the growth of their children's creativity. An important question for parents is whether it is possible to increase creativity or not. They state that the main purpose of this research is to strengthen the creativity factor in children by Iranian parents and state that the research is based on a questionnaire and several intelligence and creativity tests and the research data are analyzed based on (SPSS) and the results are as follows: To increase creativity, one must pay attention not only to the factors that increase creativity, but also to the obstacles to the growth of creativity in children.
- Haja Bava Mohidin (2015) during a study aimed at evaluating the impact of kindergarten design on children during primary education and its impact on their future education system, states that in the past, many studies have been done on kindergarten design based on architecture, geography And it has been technical, and so far no research has been done on the usefulness of design for children. They state that this research is a case study presented by "Yen (2003)", and they also point out that the data collected are based on four simulated variables: mobility, comfort, competition and control. The benefits of this research will not only be for management, design and student policies, but will also improve the education process in Malaysia.
- Karimi Azari et al. (2015) in a study entitled "The effect of residential design principles in promoting children's creativity" state that increasing creativity in children is important and also point out that the

focus of creativity articles is often on many psychological issues From the surroundings. One way to increase creativity is to use the impact of natural or artificial environments on children. Research in this field shows that the architectural structure has a direct impact on the environmental structure in residential areas and increases children's creativity. The present paper has been sampled in five stages. According to the research findings, the architectural structure of the residential environment increases creativity in children. This research seeks to find design principles that increase creativity in children.

- Holmes et al. (2015) conducted a study entitled the relationship between creativity and social games and language skills. In this study, they showed that there is a positive and significant relationship between social games and children's creativity.
- Diosius (2013) In a study for five weeks, children were given picture books that aimed to stimulate thinking and imagination and focus on their five senses. After brainstorming and children's participation in expressing ideas, it was the children's task to Complement their mental ideas of painting. The results showed that the interventions were able to develop the originality and fluidity of thinking and focusing on the five senses in children.
- Smogorzewska (2012) in his article "Story and triangular communication as a way to increase creativity: a comparison of the effectiveness of five-year-olds" states. The present article is the result of a study that compares the creativity, myth-making, word-building, and grammatical complexity of stories created in two ways: "story line" and "communication triangle." Both methods increase children's language and creative thinking abilities. This article asks 128 five-year-olds to tell a story in one of two ways. Participants participated in a daily class in 14 groups of five. The analysis of the data shows that both of these methods are creative, and also show that these methods are more creative than stories created by individual methods.
- Murat Tekin (2010) conducted research on the effect of exercise and play on the creativity of preschool children. The results showed that male and female students who exercised were more creative than students who did not exercise.
- Karowski and Soszynski (2008) believe that people's creativity in their hobbies, hobbies and pastimes grows. The results showed that people who participated in recreational sessions compared to those who did not participate showed a significant difference in two of the three indicators of creativity, namely fluidity and initiative.

Factors affecting creativity

- Encourage the child and student to have new ideas and allow them to comment on various issues.
- Encourage a sense of curiosity to create mental security - Increase information in the process of creativity and specific mental activity
- Attention to self-actualization - Motivation can also be considered the primary driving force.
- Creating confidence in the person to raise the issue - Balance in self-acceptance Controlled imagination - Consciousness.
- Leaving learners free in symbolic expression or psychological freedom. - Lack of evaluation of a person with external criteria.
- Acceptance of a condition for the scholar, which is determined by the scholar and creates power in him.
- Providing his favorite raw materials as much as possible, in other words, creating the desired atmosphere and conditions and factors
- Gradually let learners know that they need to be aware of their emotions and feelings.
- Creating the ability of scientific adaptation - Increasing the amount of effort and decision making
- Learning that behavior and action should be the product of conscious choice based on intrinsic and intrinsic values and not the result of reacting appropriately to different situations.
- Learning that you should always start from the end, and this means that we clearly define the goal that is the end of the road and always keep it in mind, and like a building engineer and architect who first puts the whole structure of the building in Design a comment and then go step by step to finalize it.
- Using a cryptographic system that can store information in your brain and memory better.

- Using all internal forces and abilities in a coordinated manner in the long run
- The existence of a parent's passion for the subject of their child's creativity and growth and talent.
- Increasing the amount of time spent on the subject of study and research.
- Dreams that are in fact purposeful and useful interactions and have an effective role in creativity (Hamraz, 2010, p. 54)

Barriers to creativity growth

1. Trying to get rid of daydreaming: Many teachers and parents see children's daydreaming as a sign of unhealthiness that needs to be eliminated. While fantasies like playing a role, telling fiction. Drawing strange and similar images should be considered as natural aspects of a child's thinking. Sure, we want some kind of logical creativity, but until the child's mental development has reached the point where he can engage in creative creative thinking, this kind of fantasy must be kept alive in him.
2. Constraints on children's curiosity: Another factor that hinders their development is over-reliance on the role of gender. The cultural importance that society places on the role of gender is the source of many conflicts for the individual, which in itself hinders the growth of creativity.
3. Emphasis on prevention: How children respond to tasks that require them to think in terms of when they find themselves in a dead end situation shows that the emphasis on prevention prevents possible solutions to the problem.
4. Elimination of fear and shyness: Because the person is less inclined to think and engage the mind, this reluctance leads to lack of creativity.
5. Emphasis on memory and verbal skills: The lending banking system of the educational system Excessive emphasis on schools of verbal skills and not paying attention to problem solving is an obstacle to the development of creative thinking abilities (Hamraz, 2010, p. 50).

AHP method

The AHP method is based on three levels.

First level: goal

In this study, the aim is to rank the factors affecting creativity.

Second level: criteria (indicators)

1. Easy to use
2. Attractive
3. Challenging
4. Motivating
5. Creating learning

Third level: Factors Affecting Creativity (Options)

1. Reading books
2. Storytelling
3. Using musical instruments and sound production
4. Creating space to display and play a role
5. Accepting the child's strange habits
6. Accept imaginary friends
7. Determining relative limitations
8. Guide to new questions
9. Cultivate a sense of curiosity
10. Polling
11. Respecting new ideas
12. Avoid excessive care and interference
13. Completing semi-finished objects and affairs
14. Touching objects closely
15. Encouraging to try different things and avoid duplicates
16. Experiment with different ways of achieving a goal
17. Different applications of a particular device
18. Familiarity with different places
19. Drawing

20. Using the taste and opinion of the child

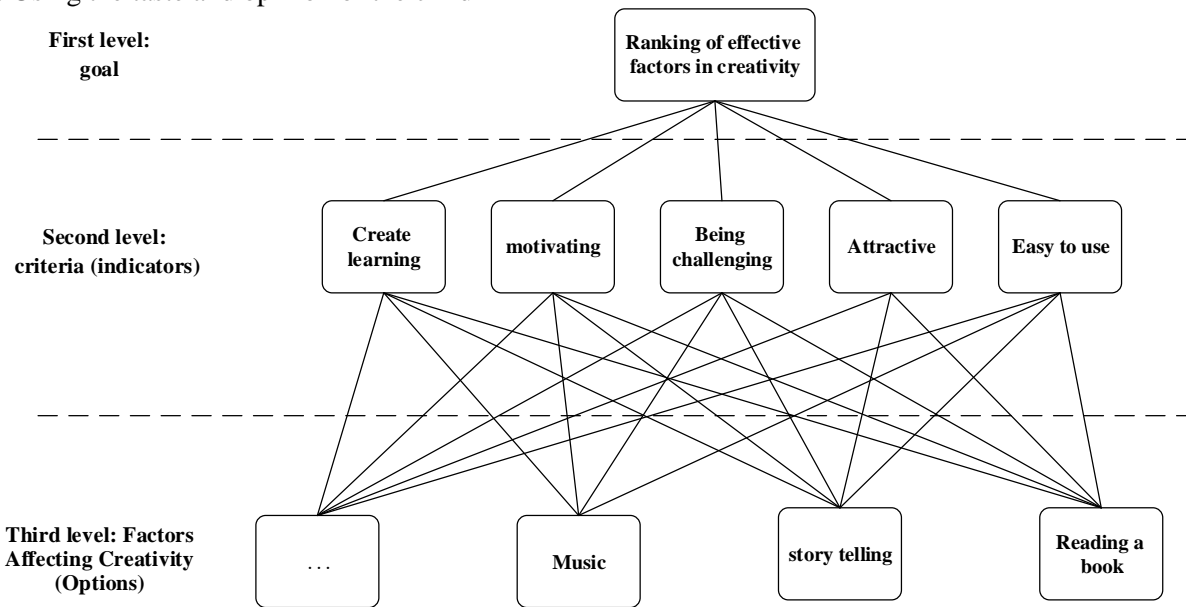


Figure 1. AHP levels

The AHP method can do two things:

- Find the weight and (relative importance) of the indicators
- Ranking of options

AHP algorithm

A: To normalize the matrix of pairwise comparisons

B: Obtain the arithmetic mean of each row of the matrix to the normalized pairwise comparisons (called relative weights)

A: Multiply the relative weights of the indicators by the arithmetic mean of the options

D: Ranking options

Research Method

This research is applied based on the purpose and descriptive and survey research based on the data collection method.

The number of kindergartens in District 5 of Tehran is 64 kindergartens, which is considered as the statistical population of this study. The sample size is 56 samples according to Morgan table.

In the present study, tools such as questionnaires, receipts and the Internet have been used to collect information.

In this research, by studying articles, related books and referring to various sources, including kindergarten experts and psychologists, we have identified the factors affecting creativity. In the initial stage, 20 factors were identified that can be based on five indicators (ease of use, attractiveness). Challenging, motivating and creating learning) categorized and assessed.

In this research, three questionnaires have been used in the following order.

To screen 20 factors obtained from different sources, a questionnaire based on the Likert scale had seven options from "extremely important" to "insignificant" among 30 kindergarten principals as distribution experts and information was collected. The validity of this questionnaire was used by experts and Cronbach's alpha method was used to measure its reliability, which was calculated by SPSS software and obtained about 0.9.

➔ Reliability

Scale:

Case Processing Summary

		N	%
Cases	Valid	30	93.8
	Excluded ^a	2	6.2
	Total	32	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.996	20

Figure 2. Calculation of Cronbach's alpha

In the next step, two questionnaires were extracted from Expert Choice software and distributed among 56 kindergarten teachers, which contained a questionnaire to determine the preference of five indicators (ease of use, attractiveness, challenging, motivating and creating learning). are measured against each other (Table 1) and another questionnaire, creativity factors (Tabl 5) are considered and measured according to the previous five indicators and their information was collected during the mentioned questionnaires and entered into the software. Due to the standardization of the questionnaire extracted from the software, they also have acceptable validity and reliability.

Table1 . Comparison of indicators with each other

Indicators																		
Attractiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Easy to use
Being challenging	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Easy to use
.
.
.

Data collection method (information)

In this study, the closed questionnaire method was used. The questionnaire was designed to screen seven Likert scale and in the extracted questionnaires, Expert Choice software was used as a nine-choice spectrum to collect information.

Data analysis method (information)

In this study, using a closed questionnaire that was distributed among kindergarten teachers in District 5 of Tehran, after collecting all the questionnaires by AHP method and by Expert Choice software, weights and factors were ranked according to importance.

Research Findings

Important factors of creativity according to experts

Initially, 20 factors were identified that had an impact on creativity, but it should be noted that these factors do not have the same impact, and some of these factors are very important compared to other factors and have a so-called determinant and key role. Therefore, in order to identify the factors that have a higher impact among the factors, a design questionnaire (according to Table 2) was distributed among

30 kindergarten principals who commented on seven levels from "extremely important" to "Unimportant".

Table 2. Comments collected from a questionnaire designed to select factors of high importance

		Extremely important	Very important	Important	Medium importance	No significant	Very insignificant	Insignificant	
Row	Creativity factors	0.975	0.85	0.65	0.5	0.35	0.15	0.025	points
1	Reading a book	10	8	7	3	2	0	0	23.3
2	story telling	8	5	8	5	2	1	1	20.63
3	Using musical instruments and producing sound	8	5	4	6	4	2	1	19.38
4	Creating space to show and play a role	8	7	5	4	4	1	1	20.58
5	Accepting the strange habits of the child	5	4	5	6	3	1	6	15.88
6	Accept imaginary friends	8	5	8	3	2	2	2	19.8
7	Determining relative constraints	3	2	5	6	4	6	4	13.28
8	Guide to fresh questions	7	4	3	6	4	5	1	17.35
9	Cultivate a sense of curiosity Poll	9	5	4	6	4	1	1	20.2
10	Respect for new ideas	7	6	7	5	4	1	0	20.53
11	Respect for new ideas	4	4	7	5	6	3	1	16.93
12	Avoid excessive care and interference	5	3	6	4	3	3	6	14.98
13	Completion of semi-finished items and affairs	5	5	6	5	4	1	4	17.18
14	Touch objects up close	9	4	6	7	1	1	2	20.13
15	Encourage to try different items and avoid duplicates	3	3	4	5	3	7	5	12.8
16	Experiment with different ways of achieving a goal	9	4	6	7	1	1	2	20.13
17	Different applications of a particular device	5	3	4	3	4	6	5	13.95
18	Familiarity with different places	4	5	6	3	3	2	7	15.08
19	to draw a painting	11	6	4	5	4	0	0	22.33
20	Use the child's taste and opinion	3	6	2	2	3	6	8	12.48
Average									17.84

Display triangular fuzzy numbers

After collecting the questionnaires, since the answers in the questionnaire are qualitative numbers, a fuzzy triangular number was assigned to each of these options to convert these numbers into definite quantitative numbers.

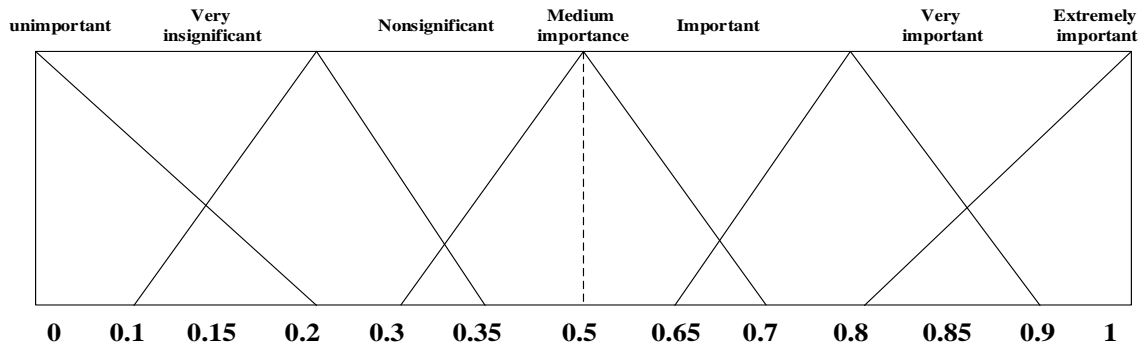


Figure 3. Display qualitative options as qualitative triangular numbers

Then, using fuzzy logic (Figure 3) and the formula for converting fuzzy numbers to definite numbers (Nekowski formula), the fuzzy numbers mentioned are converted into equivalent definite numbers in Table (3).

$$X = m + \frac{b - a}{4}$$

Table 3. Convert triangular fuzzy numbers to definite numbers

linguistic variable	triangular fuzzy number	Definite fuzzy numbers
Extremely important	(1, 0.1, 0)	0.975
Very important	(0.85, 0.15, 0.15)	0.85
Important	(0.65, 0.15, 0.15)	0.65
Medium importance	(0.5, 0.2, 0.2)	0.5
Nonsignificant	(0.35, 0.15, 0.15)	0.35
Very insignificant	(0.15, 0.15, 0.15)	0.15
unimportant	(0, 0, 0.1)	0.25

Selected factors

After collecting the data, in each row, the definite numbers are multiplied by the number of answers obtained (expert opinion) and added together. For example, in a row (1), 10 experts considered reading book is extremely important, so the number 10 was multiplied by the definite number equivalent to extremely important (0.975), and 8 people considered reading book is very important, of which 8 In a definite number of very important equivalents (0.85), the multiplications and answers obtained in each row are added together and divided by the number of experts, which was 30 people, and the score of each row is calculated.

Finally, from scores that are get averaged in columns, the total of numbers is divided by 20, which is the number of factors. Factors that are higher than the average (Table 4) are more important than other factors and are used in the ranking by Expert Choice software. They become slaves.

Table 4. Factors above average (factors with higher importance)

Row	Creativity factors	Definite fuzzy numbers							points
		0.975	0.85	0.65	0.5	0.35	0.15	0.025	
1	Reading a book	10	8	7	3	2	0	0	23.3
2	story telling	8	5	8	5	2	1	1	20.63
3	Using musical instruments and producing sound	8	5	4	6	4	2	1	19.38
4	Creating space to show and play a role	8	7	5	4	4	1	1	20.58
5	Accept imaginary friends	8	5	8	3	2	2	2	19.8
6	Cultivate a sense of curiosity	9	5	4	6	4	1	1	20.2
7	Poll	7	6	7	5	4	1	0	20.53
8	Touch objects up close	9	4	6	7	1	1	2	20.13
9	Experiment with different ways of achieving a goal	9	4	6	7	1	1	2	20.13
10	to draw a painting	11	6	4	5	4	0	0	22.33

Enter information in Expert Choice software

According to the sample size, we prepared 56 questionnaires based on 10 effective factors and kindergarten experts prepared it according to five indicators (easy to use, attractiveness, challenging, motivating and creating learning) in a final range of two to two (according to Table 5) Assessed and rated. After collecting the questionnaire, we entered their information into the expert software for ranking.

Table 5: Factors of creativity according to the indicators.

Creativity factors due to easy application																		
story telling	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Reading a book
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.
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Creativity factors according to attractiveness																		
story telling	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Reading a book
.
.
.

They were evaluated, scored, and after collecting their information, they entered the Chose Expert software for ranking. The output of Expert Choice software is as described in Table (6).

Table 5. Ranking of creative factors

Rank	Factors	points
1	to draw a painting	0.147
2	Using musical instruments and producing sound	0.121
3	story telling	0.11
4	Reading a book	0.107
5	Cultivate a sense of curiosity	0.095
6	Accept imaginary friends	0.09
7	Touch objects up close	0.088
8	Creating space to show and play a role	0.083
9	Poll	0.08
10	Experiment with different ways of achieving a goal	0.08

Discussion and Conclusion

The purpose of the study is to identify different factors that affecting the creativity of children from 3 to 5 years old in kindergartens by identifying the factors that are more effective than other factors in terms of kindergartens, although we can refer to research in this field that Taking one or two factors from creativity and examining its effect on other factors, which indicates the importance of these factors, which is consistent with the present study.

The research of Zakariaei and co-workers in Radbakhsh (2013) shows that the results of many types of research conducted abroad have shown that with the help of games and telling a story, the creativity of people, especially children, can be significantly increased.

Among the studies that have confirmed the effect of play on children's creativity can be (Berrueco, 2011), (Papilia & Olds, 2002), (MichelleSmith, 2004), (Lieberman, 1987), (Yarmohamadiyan & Gholami, 2011), (Howard- Jones, Taylor, Sutton, 2002) (Treffinger, 2008), (Bretta & Privette, 1998).

Ghasemi (2017) Using different senses of children during education can be effective in increasing the creativity of preschool children.

The results of Jamali Firoozabadi, Heidarzadeh and Keshavarz (2010) show that teaching painting by thematic selection and free method leads to increasing children's creativity.

Hariri (2016) studies storytelling in public libraries and acknowledges the increasing creativity of preschool children.

Abedi et al. (2017) by examining the factors affecting the growth of children's creativity and thinking, consider the role of the environment in fostering creativity and environmental factors and based on the

results, state that children's mental development and disobedience depend on several factors such as family. Family support, proper nutrition, facilities, school, how educators treat and respect children, child play, art, painting, design workshops for creativity, storytelling, film, computer games, poetry, museums, and places of interest.

In his research, Fazaei (2018) emphasizes the effect of music on creativity, which is consistent with the present research in terms of the importance of music.

Farajollahi (2010) in identifying the effective factors in fostering creativity from factors such as

1. Self-study education
2. Pay attention to the emotional aspects of education
3. Social independence
4. Strengthening self-assessment
5. Family efforts to give independence
6. Proportion of educational programs with growth Mental
7. Learning how to know the student
8. Trying to link previous and new learning
9. Ability to adapt the family to the environment
10. The amount of reading non-textbooks
11. Trying to strengthen self-confidence

Gratitude

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