

Assessing the Impact of Creative Tasks on Cognitive and Imaginative Development in Children

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Abstracts

Children's cognitive and imaginative development is greatly enhanced by creative projects, which establish the groundwork for critical thinking, problem-solving, and flexibility. By evaluating improvements in creativity, memory, and problem-solving abilities, this study seeks to determine how creative activities affect children's imaginative and cognitive growth. The dataset includes performance measures from 894 children between the ages of seven and ten who participated in eight weeks of either traditional or creative learning activities. Split the data into two groups, such as Group A (experimental group) and Group B (control group). A normal curriculum was followed by Group B (n=212), while Group A (n=481) participated in a variety of creative activities like music, art, and storytelling. Cognitive and imaginative assessments were administered pre- and post-intervention, covering four key indicators: fluency, originality in narrative creativity, flexibility and graphic abilities in drawing creativity. The results showed that the Group A had performed better than Group B in terms of originality. In conclusion, creative activities help children to develop specific cognitive and imaginative skills; this means that including them in curriculums is important for their overall development.

Keywords: CreativeTasks (CT), cognitive development (CD), imaginativedevelopment, Children.

Introduction

The imaginative development in both adults and children need to be creative in the twenty-first century. Creativity has long been regarded as one of the most vital skills in many nations. Cognitive ability, personality traits, genetics, and environment can have an impact on creativity, with environment having a major influence [6]. Many times, creativity is seen as the answer to the problems both presently in the future. It is acknowledged that creativity is a crucial twenty-first-century skill and a strategy is necessary for adapting to changing conditions [13]. The early childhood education field focuses on six components of development: cognitive, language, socio-emotional, physical motor, moral value, religion, and art. For a child's development, parents and teachers must provide enough stimulation for every area. However, a number of things can impede a child's growth, such as parental skills, childhood, diet, and unsuitable learning strategies or stimulation [18].

The development of cognitive abilities in children is a crucial aspect of their growth and development. This potential is set at conception and is influenced by genetic factors. However, the maturity of the opportunity and environmental factors presented can also influence the development of this cognitive potential, helping to determine the highest progressing limits at the intelligence level [16]. Cognitive development (CD) includes the development of memory, focus, reasoning, and problem-solving skills, all of them help in a child's understanding of their surroundings. Ensuring that children grow cognitively to their full potential can promote a nation's economic and social development and in the low and middle income countries (LMICs), break the cycle of inter-generational poverty. Children's cognitive and imaginative development is greatly enhanced by engaging in creative activities like music, art, and storytelling. Improvements in creativity, fluency, flexibility, and graphic skills are promoted by these exercises [1].

Imagination is the cognitive process that creates new ideas out of old ones, not only for the purposes of fantasy and creativity but also for everyday contemplations of alternatives to the world as it exists. It is significant to note that imagination is not a specific talent reserved for particular categories of "creative" or "imaginative" individuals. It explains a general cognitive mechanism that all employ to create simulations that extend beyond the sensory input that is presently available [11]. Children's early capacity for pretend play is considered a potential indicator of these generative capacities. Imagination is frequently associated with the formation of creative or uncommon possibilities [7]. Creative projects help children improve their critical thinking, problem-solving, and flexibility skills by establishing the foundation for their cognitive and imaginative growth. The goal of this study is to examine the impacts of creative activities on children's imaginative and cognitive growth by assessing increases in creativity, memory, and problem-solving abilities.

The study has been separated into the following structures: Section 2 contains the literature review and Section 3 represents the methodology. The result of the study and their outcomes were discussed in Section 4. Section 5 concludes the study.

Literature Review

Children's creativity and imagination were enhanced by teaching STEAM (Science, Technology, Engineering, Art, and Math) using stray components from media [14]. A descriptive qualitative research methodology employing documentation, interviews, and observation was used. Researchers employed qualitative data analysis approaches, such as data reduction, data presentation, and conclusion drafting. In group B, four meetings were held to perform the research involving twelve youngsters. The findings demonstrated how STEAM education combined with material from Little Parts might foster children's imagination and creativity. To determine if imaginative play fosters the prosocial and executive function development that was essential for academic achievement, [2] was conducted. The specific hypothesis was that Executive functions (EF) would clarify the connections between prosocial actions and imaginative play. Imaginative play measures, EF measures, and prosocial behaviors measures were completed by 284 preschoolers and their teachers. Interactions between these constructs were analyzed through the use of structural equation modeling. Moreover, hot EF completely mediated the connection between imaginative play and prosocial conduct.

An abridged edition of the research of the authors, which looked at the structures, methods, advantages, and challenges associated with the issue of creative play and creativity in education, was found in [5]. The image collection was an expression of the thoughts that the author had researching the project. A photographic journey was utilized to creatively express pedagogical wonderings, drawing inspiration from zoom-in puzzles. One can perceive things differently and possibly reach a state of catharsis by considering the details that are often missed while viewing an issue from several angles. To examine how creative practice enhanced the teaching of primary geography was conducted [3]. It presented an approach to teaching geography that sets students at the center of the learning process, going beyond merely offering creative lesson ideas. By doing this, the focus was shifted from information transmission to the learning process. The inability of government reports to draw a correlation between creativity and geography and the necessity for increased awareness of the ways in which creativity fosters learning via enjoyment, health, and emotional well-being are brought to light.

The necessity of structuring children's mastery of educational content as a comprehensive process, the importance of communication as the foundation for teaching in creative education, the role of the child's autonomous cognitive activity as the primary technological link, and the child's capacity for self-regulation during the activity were emphasized [9]. Preschoolers' imaginative and creative skills were developed by [8], which created active e-learning models and applications. Structured interviews and observation were used in study's qualitative methodology. Preschoolers solely from Peninsular Malaysia's central region were sampled. Utilizing, the data has been examined. The primary contribution provided a brief overview of the development of an active e-learning module with procedures, techniques, and activities that teach creative imagination skills to preschoolers in Malaysia. The module was intended to serve as a guide for teachers in integrating these skills into their lessons.

Using 1447 pupils from 34 Southern Thai schools, [15] looked into the relationship between physical activity and creativity. Active play, family time, and sedentary behavior were tracked and the creativity was examined by employing the test for the creative thinking-drawing

production (TCT-DP). While 6 to 13-year-olds did not show the association, adolescents did. In all age groups, there was a correlation between engaging in active play and spending time with family and peers. Data from interactions with the four focal children and video footage of 8 teachers interacting with them during the imaginative play were collected [4]. Teachers' six distinct pedagogical stances in children's play were identified using the concepts of double subjectivity and imaginative play. The video and data from the teacher interviews revealed that the participating teachers intentionally taught children through play by utilizing these six different pedagogical positioning methods. The goal in conducting research was to determine whether the kids were playing or if the teachers simply created stories with them.

If a pandemic were to occur in the future or if classroom instruction were to resume in a more conventional setting, the [10] provided a helpful teaching idea that was used in the classroom. To utilizing topic analysis and descriptive qualitative research methods. The results showed how beneficial information and communication technology (ICT) incorporation is for both teachers and students when considered from the perspective of CD. The usage of the used and natural resources as learning media to improve the CD was covered [17]. It was focused on the student cognitive competency, the learning procedure and the capacity of the teacher to create the instructional materials. Using a qualitative approach, collected data through document analysis, interviews, and observation. The results showed that teachers developed interesting lesson plans, effectively implemented instruction, and assisted students in improving their cognitive abilities, such as object function, number identification, and item sorting. In the age of new media, the components of fragmented reading and their effects on students' CD were outlined [12]. Data was submitted by 916 undergraduate students at six Chinese universities through internet and paper surveys. The results showed higher levels of fragmented reading (FR), particularly when it came to its temporal shape. Fragmented material, time, and attention were found to positively impact cognitive breadth but negatively affect cognitive depth; FR and cognitive growth were found to be strongly associated.

Methodology

In this section, we examined the impacts of the creative tasks (CT) on the children's imaginative development and CD by the data analysis on a sample of 894 children between the ages 7 to 10 years. The post-test and pre-test were utilized to compare the reimbursement of creative activities compared to the conventional teaching methods.

I. Research Design

To evaluate the impact of CT on the imaginative and the CD, a quasi-experimental method was employed by incorporating pre-test and post-test. This study compared the efficiency of the creative activities with the conventional teaching methods by utilizing the group comparison.

II. Data Collection

Data was submitted by participants from different schools. The sample comprised 894 children aged 7 to 10 years, who were randomly allocated to the two groups. Data were gathered by administering standardized tests at the beginning and end of the eight-week intervention period.

The performance metrics in the dataset for problem-solving, creativity, and memory were all selected with care. Fig.1 illustrates how the data was collected.

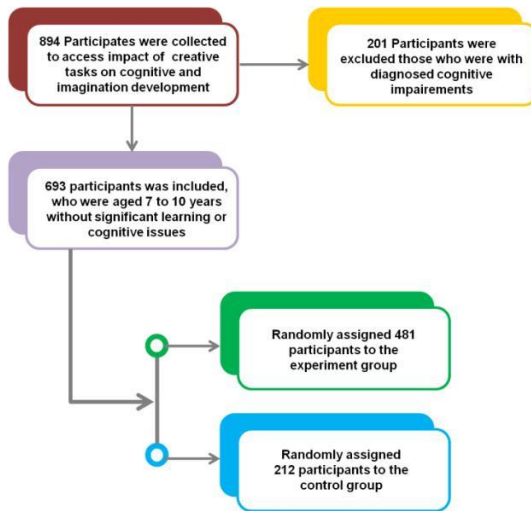


Fig1 Flow of Data Collection

III. Selection Criteria

A key aspect of this investigation was defining the selection criteria for inclusion and exclusion.

Inclusion Criteria

The study evaluated the effects of CT on 693 participants aged 7 to 10 years. To ensure a thorough evaluation, participants were required to be in this age range and to have no significant learning disabilities or other conditions that could affect cognitive development.

Exclusion Criteria

The exclusion criteria resulted in the excluding 201 participants from this study. Excluded individuals included those outside the age range of 7 to 10 years, those with the diagnosed cognitive impairment or severer behavioral issues and those who did not complete the full eight week intervention.

IV. Separating Data

A total of 693 participants were separated into 2 groups, such as Group A and B.

Group A

A total of 481 individuals participated in Group A, pursuing a variety of musical, art and storytelling. To assess the impact of creative exercises on imaginative and CD, this group was chosen. To improve the statistical power and dependability of the results, a larger sample size was utilized. The objective was to illustrate the advantageous impacts of inventive thought, artistic endeavors on creativity, and problem-solving abilities.

Group B

A total of 212 participants in Group B completed a regular curriculum without any additional creative exercises. This group was utilized to observe the specific impacts of the CT as well as to compare naturally occurring differences in cognitive and imaginative ability. The validity of this study's conclusions is increased when the effects of the intervention are inaccessible from other variables by using a well-defined Group B.

V. Assessment Tools

Pre-Test and Post-Test

Pre-Test: It is administered to create baseline measurements before the intervention.

Post-Test: It is administered immediately, after the eight-week intervention to evaluate alterations in the development of the imagination and cognition.

Indicators

Fluency: Measured using verbal production activities.

Originality: Assessed according to how distinctively the narrative answers were presented.

Graphic Abilities: Assessed using illustration exercises.

Flexibility: Assessed by thinking differently and adjusting to novel situations.

VI. Statistical Analysis

The statistical analysis included pre- and post-testing to measure changes in creativity, memory, and problem-solving abilities. The post-test and pre-test findings in each group were compared by utilizing the paired samples t-test by using the independent sample t-test, the difference between the 2 groups were examined. The outcomes showed that there is a noteworthy difference ($p < 0.01$) in the improvements in creativity and imaginative thinking between two groups for memory enhancement. This suggests that while creative enhances some cognitive and imaginative skills, it has no discernible immediate effects on memory.

Result and Discussion

To evaluate the impact of CT on children's cognitive and imaginative development, this section analyzes the pretest and posttest results for the two groups by utilizing the Independent Samples T-test and the Paired Samples T-test.

I. Demographic Characteristic

The term demographics refers to the attributes of study participants, such as their age, gender, socioeconomic status, geographic region, parental education level, and kind of school as represented in Table I. These characteristics help to ensure group comparability and to understand the makeup of the sample. They are crucial for controlling any confounding variables and figuring out whether the study's conclusions might be applied broadly. The selected participants' parental education level is depicted in Fig. 2.

Table I Demographic Data of Participants

Demographic Characteristic	Group A (n=481)	Group B (n=212)
Age (Years)		
7	120 (24.9%)	60 (28.3%)
8	140 (29.1%)	65 (30.7%)
9	140 (29.1%)	55 (25.9%)
10	81 (16.8%)	32 (15.1%)
Gender		
Male	248 (51.6%)	100 (47.2%)
Female	233 (48.4%)	112 (52.8%)
Socioeconomic Status		
Low	150 (31.2%)	80 (37.7%)
Middle	265 (55.1%)	100 (47.2%)
High	66 (13.7%)	32 (15.1%)
Geographic Region		
Urban	340 (70.7%)	150 (70.8%)
Rural	141 (29.3%)	62 (29.2%)
School Type		
Public	350 (72.8%)	140 (66.0%)
Private	131 (27.2%)	72 (34.0%)
Parental Education Level		
High School or Less	130 (27.0%)	70 (33.0%)
Some College or Associate Degree	160 (33.2%)	80 (37.7%)
Bachelor's Degree	150 (31.2%)	50 (23.6%)
Postgraduate Degree	41 (8.5%)	12 (5.7%)

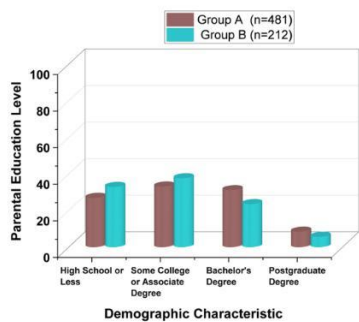


Fig 2 Parental Education Level of the Participants

II. Assessments of the Paired Samples T-test on the Impact of CT on the Cognitive and Imaginative Development

If the mean values of the two related groups vary considerably from one another, it is determined using a statistical technique referred to as the paired samples T-test. It is widely utilized for instance, when testing the identical subjects twice, one before and one after therapy. The information from the paired T-test is used in the accompanying table to compare the mean scores for children's cognitive and imaginative development at the pre- and post-test for two groups: Group A, which engaged in creative activities, and Group B, which stuck to traditional activities. Among the measures are creativity, fluency, flexibility, and graphic abilities. The pre-test mean (M) represents the average creative imagination score prior to the intervention, and the post-test mean (M) represents the score eight weeks later. The standard deviation (SD) is utilized to calculate the score variance within each group. Sample size in statistical testing is correlated with degrees of freedom (df), and group mean variation is measured by the t-value (t). When the p – value is less than 0.05, then it indicates there is a numerically considerable difference between the groups, which implies that the creative activities are beneficial in fostering imaginative thinking. Table II indicates the post-test and the pre-test mean scores for cognitive and imaginative development are shown in the paired T-test results.

Table II Results for pre-test and post-test mean scores in Cognitive and Imaginative Development using the Paired Samples T-Test

Groups (Group A and Group B)	Test of Creative Imagination	n	Pre-test Mean (M)	Post-test Mean (M)	Pre-test SD	Post-test SD	df	t	p – value
A	Fluency	481	2.01	2.89	0.62	0.58	480	-9.45	.00*
B		212	1.95	2.08	0.65	0.60	211	-2.58	.01*
A	Originality	481	1.70	1.85	0.22	0.19	480	-4.67	.00*
B		212	1.60	1.65	0.16	0.17	211	-1.92	.06
A	Flexibility	481	15.22	17.12	5.03	4.85	480	-6.51	.00*

B		212	14.90	15.25	4.88	5.12	211	-1.29	.20
A	Graphic	481	3.55	4.12	1.12	1.01	480	-8.45	.00*
B	Abilities	212	3.42	3.51	1.23	1.30	211	-1.02	.31

Note: * $p < .05$

The Group A showed significant improvements in every variable: originality, flexibility, graphic abilities, and fluency. Fluency increased from 1.70 to 1.85 ($t = -4.67$, $p < .05$), and originality from 3.55 to 4.12 ($t = -8.45$, $p < .05$). Only fluency ($t = -2.58$, $p = .01$) displayed a noteworthy improvement in Group B's less significant alterations. Comparing creative learning activities to standard learning techniques, children's cognitive and imaginative skills are greatly enhanced, as demonstrated by these data.

III. Assessment of CTs on cognitive development and imaginative development using the independent Samples T-test.

A statistical analysis called Independent samples T-test was utilized to establish whether the means of 2 independent groups vary considerably from one another. This test determines whether the observed differences are statistically significant or the result of chance, and it is appropriate when comparing two different groups on a given measure. Tested the demographic characteristics like age, gender and socioeconomic status using the independent T-test for post-test mean scores across various CT is presented as illustrated in Table III.

Table III Results for Post-Test Mean Scores of CT by Demographic Characteristics using the Independent Samples T-Test

Creative Tasks Testing	Group A (n)	Group A (Mean)	Group A (SD)	Group B (n)	Group B (Mean)	Group B (SD)	t	df	p – value
Age									
Fluency	120	2.72	0.67	60	2.16	1.16	3.90	180	0.00*
Originality	115	1.73	0.19	55	1.69	0.21	0.84	168	0.41
Flexibility	130	3.50	0.45	65	3.10	0.55	2.05	193	0.04*
Graphic Abilities	117	8.90	2.20	62	7.80	2.50	1.80	177	0.08
Gender									
Fluency	240	2.80	0.70	100	2.00	1.10	4.00	338	0.00*
Originality	230	1.75	0.20	105	1.65	0.22	1.40	333	0.16
Flexibility	250	3.60	0.50	110	3.00	0.60	2.50	358	0.01*
Graphic Abilities	245	9.00	2.30	108	7.70	2.60	2.30	351	0.02*
Socioeconomic Status									
Fluency	160	2.60	0.65	80	2.30	1.20	1.50	238	0.14
Originality	155	1.70	0.25	75	1.70	0.23	0.00	228	1.00
Flexibility	170	3.40	0.55	85	3.20	0.50	1.20	253	0.23
Graphic Abilities	165	8.70	2.40	80	8.00	2.70	1.20	243	0.23

Note: * $p < 0.05$

Table III shows how the Group A outperformed the Group B in terms of performance in fluency when compared to age and flexibility, but not in terms of originality or graphic abilities. In terms of gender, there were significant differences in terms of graphic abilities, flexibility, and fluency,

but not originality. No discernible variations were found for socioeconomic status in any of the CT. This suggests that socioeconomic level did not substantially affect the results.

IV. Overall Outcomes

All of the factors that were assessed showed that Group A performed better than Group B. In particular, Group A demonstrated improved creative and cognitive ability, as shown in the Table IV and Fig. 3.

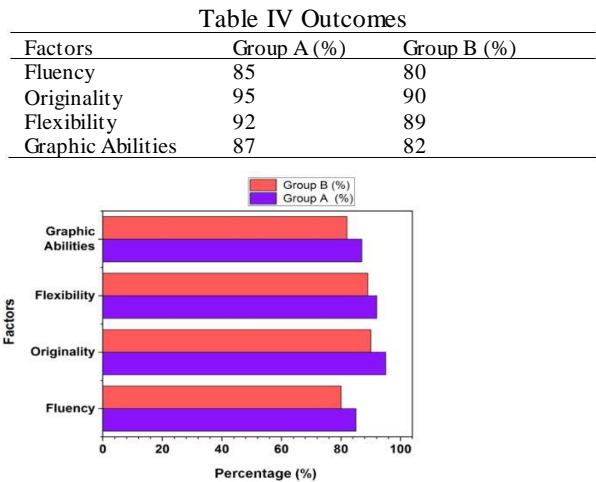


Fig 3 Overall Outcomes of the Group B andGroup A

From the Table IV, Group A established an improved creative and cognitive ability as evidenced by higher fluency (85% vs. 80%), originality (95% vs. 90%), and flexibility (92% vs. 89%). Furthermore, they had much greater graphic ability (87% vs. 82%), indicating enhanced visual and design talents. Overall, these findings show that, Group A possessed more advanced talents in creativity, originality, adaptability, and graphical skills compared to Group B.

Conclusion

Comparing creative learning activities to standard learning techniques, this study showed that children's originality and innovative thinking are considerably improved by engaging in creative activities like music, art, and storytelling. Even with these gains, there were no appreciable differences between the two groups when it came to memory enhancement. One drawback mentioned is the short duration of the intervention, which might have prevented longer-term progress. Despite this, the results highlight the need for including artistic endeavors with

academic programs to develop children's critical thinking, problem-solving, and cognitive flexibility. These exercises establish the groundwork for fundamental cognitive and creative abilities, indicating more widespread use of creative learning techniques might be advantageous for children's general development. Group A outperformed Group B across all the factors, showing the higher percentages in fluency (85% vs. 80%), originality (95% vs. 90%), flexibility (92% vs. 89%) and graphic abilities (87% vs. 82%). To properly comprehend the influence of creative activities on multiple areas of cognitive and imaginative growth, future studies should investigate longer intervention durations and additional outcomes.

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