International Journal of Advance and Innovative Research
Volume 11, Issue 3 (II): July – September 2024
ISSN 2394 - 7780

EFFECT OF CREATIVE THINKING PROGRAMME ON THE DIMENSIONS OF CREATIVITY AMONG STUDENTS

Komal Gehlawat[1*] and R.S. Pandey[2]
[1]Research Scholar, Department of Commerce, Hemvati Nandan Bahuguna Garhwal University, Srinagar, Uttarakhand, India
[2]Professor, Department of Commerce, Hemvati Nandan Bahuguna Garhwal University, Srinagar, Uttarakhand, India
Correspondence Author: komal.gehlawat@gmail.com

ABSTRACT

Background:
J.P. Guilford identified convergent and divergent thinking as the two main aspects of thinking. Divergent thinking is concerned with widening the perception of an individual and generating as many ideas as possible and has three main dimensions namely fluency, flexibility, and originality, while convergent thinking is a narrow concept and concentrates only on finding one correct answer. It is observed that a person with greater divergent thinking skills demonstrates a higher degree of creativity. Therefore, divergent thinking tests are widely used as a means to assess creativity of an individual.

Objectives:
1. *To compare adjusted mean score of fluency of Experimental Group and Lecture Method Group by taking pre-fluency as covariate.*
2. *To compare adjusted mean score of flexibility of Experimental Group and Lecture Method Group by taking pre-flexibility as covariate.*
3. *To compare adjusted mean score of originality of Experimental Group and Lecture Method Group by taking pre-originality as covariate.*

Methods:
The present study was experimental and opted for a non-equivalent control group method. The Cognitive Research Trust (CoRT) treatment was administered to the experimental group for a predetermined period of time. The Passi Test of Creativity was used to assess the pre- and post-experiment scores of creativity.

Results: *The CoRT programme was found to have a significant effect on the creative development of students for all constructs of creativity*

Conclusions: *The CoRT programme could be employed in classrooms to enhance the creativity of students.*

Keywords: *CoRT Programme, Creativity, Experiment, Flexibility, Fluency, and Originality*

INTRODUCTION

Thinking is the basic characteristic of all human beings (Abdi, 2012). Thought is the mother of everything that is ever conceived. There are two branches of thinking, namely convergent thinking and divergent thinking (Guilford, 1954). Divergent thinking seeks to produce as many solutions as possible to the current challenge, while convergent thinking concentrates on identifying one correct answer. The majority of educational efforts today are primely focused on convergent thinking and very little freedom is given to students to show their creativity (Parnes, 1970; Craft, 1999; Kaila, 2005; Runco, 2014). However, the uncertainties and turmoil of the modern world have brought about the realisation that convergent thinking can serve only short-term objectives, and society needs divergent, aka creative, thinkers to produce creative solutions to deal with present and future unprecedented remonstrances. The observations of social scientists (like J.P. Guilford) supported by the results of the empirical studies have established creativity as a skill that could be developed and refined with purposeful practices. Over the years, many thinking training programmes have been developed, either to facilitate subject-specific thinking or general thinking skills. Embodied and reflective are the two branches of a creativity training programme (Byrgea & Tang, 2015). Embodied creativity training programmes focus on developing general creative ability, while reflective creativity training programmes focus on understanding theories, processes, or techniques through workshops, seminars, lectures, etc. (Byrgea & Tang, 2015). One such embodied creativity training programme is de Bono's Cognitive Research Trust (CoRT), which targets stimulating general thinking skills among people. The majority of studies carried out to examine the effectiveness of the CoRT programme on creativity have reported a significant effect, while some studies (e.g., Osman et al., 2000) do not report any significant improvement in students. The studies that are conducted in

ISSN 2394 - 7780

India have produced results in support of the CoRT programme (Gupta, 2015; Pahuja, 2017; Singh, 2001). However, the scope of these studies remained confined to analysing the effect of the CoRT programme on the overall creativity of participants. The goal of the current study is to examine how the CoRT programme affects each aspect of creativity (namely fluency, flexibility, and originality) separately when compared with the traditional lecture method. By analysing the effect of the CoRT programme on each dimension, a better insight could be drawn into the kind of thinking tool that affects a particular dimension of thinking (more than the others) and how the existing programmes could be modified or the new training programmes could be formulated to target a particular domain of thinking (or creativity). Furthermore, the results of the substantial number of studies in this domain could be compared to shed light on a) which cognitive skill (amongst the three) is easiest to develop, b) if any difference lies in the embodied and reflective creativity training programme in developing the dimensions of creativity, and c) which training programme (general or specific) is more effective in developing the cognitive skills of students.

LITERATURE REVIEW

CREATIVITY AND DIMENSIONS OF CREATIVITY

Creativity is a complex cognitive activity (Feldhusen & Goh, 1995), and a multidimensional concept (Sternberg, 2005). Over the years, many researchers explored different scopes of creativity, but novelty and appropriateness remained its central features (Amabile, 1987; Lubart, 1994; MacKinnon, 1962). In the beginning, creativity was seen as an inborn quality that could not be taught and was confused with intelligence. It was researchers like Barron & Harrington (1981), Feldhusen & Goh (1995), and Kaufman (2015) who identified that creativity is not only restricted to intellectual functioning; rather, it is a mix of personality, motivation, and environmental factors. Whereas, researchers like de Bono, Feuerstein, and Nigel Blagg acknowledged creativity as a skill that could be developed through regular training (McGregor, 2007). Creativity is the "natural human process" of becoming aware of issues, propagating theories to address the deficiencies, and coming up with solutions after testing and retesting the theories (Torrance, 1965). Even after more than seventy years of scientific study, creativity is still a developing field. Thus, simply put, creativity is the cognitive function of investigating the various options that could be applied in a given situation.

The two main aspects of thinking are divergent and convergent thinking. Hargreaves (1927) was the first to elaborate on divergent thinking (as cited by Antink-Meyer & Lederman, 2015). Later, Guilford proposed that divergent and convergent thinking are two different categories of thought. Convergent thinking comes into play when an individual aims to come up with only one practicable option. It leads thinking to the right, conventional, or most agreeable answer (Bentley, 1966) while divergent thinking leads to thinking in many directions, i.e., searching. Divergent thinking deals with open-ended questions, whereas convergent thinking is concerned with closed-ended questions. Runco (2011) defined divergent thinking as “cognition that leads in various directions." Divergent thinking is parallel to creativity. Similar to creativity, divergent thinking is concerned with exploring as many alternatives as possible before selecting the best course of action. Furthermore, divergent thinking is more complex than convergent thinking (Antink-Meyer & Lederman, 2015; Basadur, Graen, & Green, 1982; Runco & Vega, 1990) and it is a dependable prognosticator of creativity (Kim, 2011; Milbrandt & Milbrandt, 2011; Runco & Acar, 2012; Sternberg, 2006). Many theories of creative thinking are connected with divergent thinking and its associatory methods (Runco, 2014). Torrance (1970) expanded on Guilford's concept of divergent thinking and established four sub-categories—fluency, flexibility, originality, and elaboration—which he later applied to shape the Torrance Tests of Creative Thinking (TTCT), a divergent thinking assessment of creativity. Divergent thinking tests are frequently used in research to measure creativity and the sum of the scores for fluency, flexibility, and originality is the score for divergent thinking.

The capacity to produce as many thoughts as possible is referred to as fluency, whereas flexibility is the ability to produce responses that span several categories, while statistically unique responses fall into the category of originality. Flexibility is frequently regarded as being crucial to the process of producing creative effects (Russ, 2002). The awareness of fluency enables a person to consciously look in as many directions as possible. Wilson et al. (1954) identified flexibility as essential for the generation of ideas, hence creativity. Flexibility is described as the ability to adapt to changing instruction while breaking through the inertia of thoughts; on the other hand, originality is the cleverness to produce remote, unusual, and unconventional associations (Wilson et al., 1954). When compared to other creative variables, the originality of an idea has the highest economic value.

THINKING PROGRAMME AND COGNITIVE RESEARCH TRUST (CORT) PROGRAMME

de Bono (1995) and Gupta (2015) have identified escape and provocation as the two basic principles of creativity training. Escape is the stepping stone to creativity. Escape happens when people dissociate themselves from the usual pattern of thoughts and try to look for alternative ways to reach the same end. Whereas

ISSN 2394 - 7780

provocation is the moving force of creativity, Provocation is an experiment within the mind (Gupta, 2015). Provocation is a technique for generating ideas by navigating through alternatives (de Bono, 1983). Many programmes have been created over the years to improve people's cognitive capacities through intentional interventions. Some thinking programmes were developed to enhance subject knowledge, while others were developed to develop the general thinking skills of a person. Domain-specific (or reflective creativity training) programmes are mainly based on learning theories and remain confined to the development of subject-explicit knowledge. While general thinking programmes (or embodied creativity training programmes) cover a wide range of situations in which they can be applied. The current study opted for the CoRT programme, which was pronounced by Edward de Bono in Cambridge, England. The CoRT programme is a general thinking programme that uses a general operation approach to enhance creativity through techniques that are designed for open-ended questions. This thinking programme can be applied to individuals belonging to different ages, having diverse academic backgrounds, and belonging to various hierarchy of knowledge. De Bono (1995) defined creativity as the mental process of breaking the habitual pattern of perceiving things and widening the perspective to generate new ideas. Through the CoRT programme, de Bono stressed finding alternatives other than the obvious course of action. It provides techniques and tools that can be applied to different thinking situations, therefore redeeming pupils from content-based learning. The greatest advantage of the CoRT programme is that it does not require formal teacher training (McGregor, 2007). The CoRT programme replace the “you are wrong, therefore I am right” approach with a more inclusive approach where all the opinions get equal weightage. Learning outcomes from the CoRT programme are simply transferable from one type of problem to another since the emphasis is on the method (via the use of thinking tools) and not on content (de Bono, 1985).

METHOD

RESEARCH HYPOTHESES

The study seeks to test the below mentioned hypotheses:

H_{01}: There is no significant difference in adjusted mean score of fluency of Experimental Group and Lecture Method Group by taking pre-fluency as covariate.

H_{02}: There is no significant difference in adjusted mean score of flexibility of Experimental Group and Lecture Method Group by taking pre-flexibility as covariate.

H_{03}: There is no significant difference in adjusted mean score of originality of Experimental Group and Lecture Method Group by taking pre-originality as covariate.

EXPERIMENT

EXPERIMENTAL DESIGN AND PROCEDURE

The study was formed using a quasi-experimental approach. It used a non-equivalent control group design to examine the effect of thinking techniques on the creativity dimensions of students. The study used the pre-post test method to draw a comparison between the results of the dimensions of creativity corresponding to thinking strategy. The thinking strategy had two levels, namely the CoRT programme and Lecture Method, while the dimensions of creativity assessed in the study were fluency, flexibility, and originality. Only the Experimental Group, was given the treatment at the rate of one period per working day for three months. The treatment was a CoRT programme that comprised techniques like PMI – Plus, Minus and Interesting, EBS – Examine Both Sides, AGO – Aims Goals and Objectives, etc. that were employed in the study. These techniques could be laboured through open-ended questions or exercises. The experiment comprised three stages: assessment of the prior level of fluency, flexibility, and originality, treatment, and post-experiment assessment of fluency, flexibility, and originality. The experiment started with the formal introduction of the CoRT programme along with an outline of the experimental process for the participants. Then the experimental group was given lessons in the CoRT thinking tools and techniques through the exercises developed for class interaction by the researchers. Before the start of each technique, participants were given instructions and explained the purpose of the technique. Participants worked in self-organised groups and wrote down their responses within the stipulated time, which was followed by the class discussion where the representative of each group reported the thinking and responses of its group members. During this time, the control group continued with normal school activities and was taught through the traditional lecture method. In the post-experiment phase, participants completed the same creativity test within the restricted time. It represented the final stage of the experiment.

ISSN 2394 - 7780

PARTICIPANTS

The participants were twelfth-grade commerce students (n=83) belonging to government-aided schools located in the Gurugram and Faridabad districts of Haryana. The school located in Gurugram was randomly chosen as the experimental group (n=43) while the school located in Faridabad was chosen as the lecture method group (n=40). The mean age of group members was 16.77 years, with a 0.75-year standard deviation. The schools were similar in all aspects of academics, giving students a homogenous learning background. The participants in both groups were never subjected to the CoRT programme before.

TESTING INSTRUMENTS

The Passi Test of Creativity (PTC) by B.K. Passi, was adopted to assess the variables of creativity and to determine whether the thinking strategy can have an effect on the fluency, flexibility, and originality of participants. The test was divided into three sections that assessed only the verbal creativity of participants. The first section was the Seeing Problems Test, which assessed fluency only. The second section was the Unusual Uses Test, which assessed fluency, flexibility, and originality. The last section, i.e., the Consequences Test, assessed the fluency and originality of ideas. Each part was completed within the stipulated time. The scores were summated from across the sections to get the total pre-post scores of fluency, flexibility, and originality. Many researchers, including Borchetia & Kalita (2018), Pahuja (2017), and Ponnusamy (2019), have used PTC to assess creativity in their research.

RESULTS

DATA ANALYSIS

SPSS Statistics V25 was used to analyse the data. Before running the statistical test, the dependent variables, i.e., fluency, flexibility, and originality scores, were checked for a normal distribution. Kolmogorov-Smirnov tests indicated that the significance level of all the variables in both groups was above 0.05, indicating a normal distribution except for the for the flexibility of the lecture method group. However, the F test is robust to the normal distribution (Broota, 1989/2014). Thus, for greater precision and to eliminate the individual disparities in the fluency, flexibility, and originality scores of participants, the researchers decided to conduct a one-way ANCOVA to compare the adjusted mean scores of fluency, flexibility, and originality (separately) of students belonging to the experimental group and the lecture method group by taking pre-fluency, pre-flexibility, and pre-originality as the covariates, respectively.

RESULTS AND INTERPRETATION

The first objective was to analyse the effect of thinking strategy on the fluency of students by comparing the adjusted mean score of fluency of students belonging to the experimental group and the lecture method group by considering pre-fluency as the covariate. The results are given in Table 1.

Table 1: One-Way ANCOVA of fluency of Students by taking pre-fluency as covariate

Source of Variance	df	SSy.x	MSy.x	Fy.x	Remark
Thinking Strategy	1	15164.39	15164.39	132.3	$p<0.01$
Error	80	9169.57	114.62		
Total	83				

The adjusted F-value was significant at $F(1, 80) = 132.30$, $p<0.01$ (Vide Table 1). It indicates that thinking strategy had a substantial effect on the fluency of students when their pre-fluency was taken as the covariate, with an effect size (ηp^2) of 0.62. Hence, the conjecture that there is no significant difference in the adjusted mean scores of fluency of students belonging to the experimental group and lecture method group by taking their pre-fluency as a covariate is rejected. The experimental Group's adjusted mean fluency score was 65.70, which was significantly higher than that of the lecture method group's adjusted mean score of 38.40.

The second objective was to analyse the effect of thinking strategy on the flexibility of students by comparing the adjusted mean score of the flexibility of students belonging to the experimental group and the lecture method group by considering pre-flexibility as the covariate. The results of one-way ANCOVA are depicted in Table 2.

ISSN 2394 - 7780

Table 2: One-Way ANCOVA of flexibility of Students by taking pre-flexibility as covariate

Source of Variance	df	SSy.x	MSy.x	Fy.x	Remark
Thinking Strategy	1	153.06	153.06	38.56	p<0.01
Error	80	317.53	3.97		
Total	83				

The adjusted F-value was significant at F (1, 80) = 38.56, p<0.01 (Vide Table 2). It indicates that thinking strategy had an effect on the flexibility of students when pre-flexibility was considered as the covariate and had a moderate effect size (ηp^2) of 0.33. Hence, the conjecture that there is no significant difference in adjusted mean scores of the flexibility of students belonging to the experimental group and the lecture method group by taking their pre-flexibility as a covariate is rejected. Furthermore, the adjusted mean flexibility score (M_{adj} = 5.64) of the lecture method group was significantly lower than the adjusted mean flexibility score (M_{adj} = 8.46) of the experimental group.

The third objective was to compare the adjusted mean score of originality of students belonging to the experimental group and the lecture method group by considering pre-originality as the covariate. The results of one-way ANCOVA are depicted in Table 3.

Table 3: One-Way ANCOVA of originality of Students by taking pre-originality as covariate

Source of Variance	df	SSy.x	MSy.x	Fy.x	Remark
Thinking Strategy	1	2454.17	2454.17	30.52	p<0.01
Error	80	6432.62	80.41		
Total	83				

The adjusted F-value is significant at F (1, 80) = 30.52, p<0.01 (Vide Table 1). It indicates that thinking strategy had a substantial effect on the originality of students when their pre-originality was taken as the covariate, with an effect size (ηp^2) of 0.33. Hence, the conjecture that there is no significant difference in the adjusted mean scores of originality of students belonging to the experimental group and the lecture method group by taking their pre-originality as a covariate is rejected. The adjusted mean score of originality in the experimental group (M_{adj} = 28.60) was considerably higher than the adjusted mean score of the lecture method group (M_{adj} = 17.24).

DISCUSSION

The results of the experiment showed that students who were given training in the CoRT thinking lessons showed significant improvement in the fluency, flexibility, and originality aspects of creative thinking when compared with the students who continued with the conventional lecture method. Thus, it could be said that the CoRT programme served as an effective thinking tool. These findings are in line with the results of previous studies, which have shown that the CoRT programme has a significant effect on students' creativity (Barak & Doppelt, 1999; Gupta, 2015; Pahuja, 2017). A general thinking programme like the CoRT programme can play a substantial role in developing the overall creativity of an individual. The post-experiment results of the current study have shown that the CoRT programme has a significant effect on all the dimensions of creativity. The CoRT programme has a flexible structure and it does not follow any defined sequence of tools and techniques to be applied (however, it is recommended that out of six parts, trainers should start with CoRT 1). It is also liberal in its application to different content and thinking circumstances. It is the fluid nature of the CoRT programme that allowed participants to gain comfort with the thinking exercises and produce as many responses as possible (fluency), from as many aspects as possible (flexibility), and with as much uniqueness as possible (originality). The CoRT exercises are designed in a manner that broadens the perspective of trainees; thus, students were made to examine a situation from different viewpoints (technique example: EBS and OPV) while analysing the positive and negative aspects of the situation (technique example: PMI). The CoRT exercises also helped the students to take a step back and analyse the short-term and long-term consequences of their actions and decisions (technique example: sequence and consequences). The mix of CoRT techniques developed the cognitive ability of students to think, produce solutions, and then analyse each input critically one by one. Further, students worked in groups that allowed them to get a deep insight into each other's thoughts, which additionally obligated them to look beyond the obvious or most common answers. This process worked as an unconscious force for students to consciously look for more and more answers, switch categories when they hit a bottleneck in one category, and provide unique solutions to stand out (both as an individual and as a group).

ISSN 2394 - 7780

The teamwork helped them to build a much stronger social circle and helped to build a deeper understanding of each other's thought processes.

The group discussion was also found to benefit students' cognitive and psychological development. Students worked in self-organised groups of four to five members. Through this group activity, students became more open to the views and opinions of others and came out of the "I am always right" mindset. Inter-group and intra-group discussions helped the students widen their insights and explore different alternatives to reach the same goal. Intra-group discussions had a larger effect on fluency, while inter-group discussions majorly affected the flexibility of students. Renzulli et al. (1974) found that group settings have a significant effect on the fluency, flexibility, and originality scores of participants. Thomas and Fink (1963) also reported that group settings have a significant effect on individual and group productivity. The discussions within one group helped members to first identify the line of thought and then dig deeper into it by analysing the problem from different aspects. On the other hand, when each group shared its opinion in the class discussion, the other groups realised an alternative way of approaching the same problem. The post-experiment results showed that the CoRT programme is superior to the lecture method in improving the fluency, flexibility, and originality of students. The lecture method of teaching is criticised around the world for its one-way transfer of information and because it discourages students from active participation in the classroom. The lecture method has failed to initiate thought provocation among students. The CoRT programme is adaptable in its application, and it has the potential to play a significant role in developing students' thinking regardless of grade or level of knowledge. The present study further establishes researchers' claim that a thinking programme should be introduced in the school curriculum (Best, 1982; Florida, 2004).

To facilitate creativity and its subdivisions, a thinking programme must be integrated into the teaching process of students, starting at the school level. The present study further established that regular training could help students become more sensitive and insightful in their understanding of their problems. The CoRT programme could serve as an effective thinking tool in the present increasingly stressful world, where individuals are subjected to more thinking and decision-making than ever before. The importance of creativity has been recognised at the individual as well as the social level. At the personal level, creativity helps in the workplace and daily life, while at the social level, it can lead to a discovery in art, a scientific invention, or a social movement (Lubert, 1994).

CONCLUSION

The study used the quasi-experimental research method to determine the effect of the CoRT programme on commerce students' fluency, flexibility, and originality and discovered that the CoRT programme is significantly more effective than the lecture method. The analysis of the adjusted mean scores revealed that the CoRT programme significantly improved the fluency of students, followed by originality, while little improvement was observed in the flexibility of students.

Funding: No funding was received to carry out the current research.

DECLARATIONS:

Authors' contributions:

Komal Gehlawat: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing.

Prof. R.S. Pandey: Conceptualization, Formal analysis, Writing – review & editing, Supervision.

Conflicts of interest/ Competing interests: The authors have no competing interests to declare that are relevant to the content of this article.

Data availability statement: The data belong to the Ph.D. thesis of the researcher. Data would be made available upon reasonable request and after due approval from the supervisor and the university.

Ethical Approval:

The treatment was in the form of classroom discussions where students were subjected to different thinking tools. Teachers were welcome to participate and oversee the treatment.

Consent to participate: Informed consent was obtained from all individual participants included in the study.

ISSN 2394 - 7780

REFERENCES

- Abdi, A. (2012). A study on the relationship of thinking styles of students and their critical thinking skills. *Procedia - Social and Behavioral Sciences*, 47, 1719 – 1723.
- Antink-Meyer, A., & Lederman, N. G. (2015). Creative cognition in secondary science: An exploration of divergent thinking in science among adolescents. *International Journal of Science Education*, 37(10), 1547–1563. https://doi.org/10.1080/09500693.2015.1043599
- Barron, F., & Harrington, D. M. (1981). Creativity, Intelligence, and Personality. *Annual Review of Psychology*, 32(1), 439–476. DOI: 10.1146/annurev.ps.32.020181.002255
- Barak, M. & Doppelt, Y. (1999). Integrating the Cognitive Research Trust (CoRT) Programme for Creative Thinking into a Project-based Technology Curriculum. *Research in Science & Technological Education*, 17(2), 139-151. DOI:10.1080/0263514990170202
- Basadur, M., Graen, G. B., & Green, S. G. (1982). Training in creative problem solving: Effects on ideation and problem finding and solving in an industrial research organization. *Organizational Behavior and Human Performance,* 30(1), 41–70. DOI: 10.1016/0030-5073(82)90233-1
- Bentley, J.C. (1966). Creativity and Academic Achievement. *The Journal of Educational Research*, 59 (6), 269-272.
- Borchetia, B. & Kalita, M. (2018). A Study on the Creativity of Adolescent Girl Students of Jorhat District, Assam in Relation to Their Academic Achievement. *International Journal of Creative Research Thoughts,* 6(1), 383- 388.
- Broota, (2014). Experimental Design in Behavioural Research (1st ed.). New Age International (P) Ltd., Publishers, New Delhi. (Original work published 1989).
- Brown, R. T. (1989). Creativity: What are we to measure? In J. A. Glover, R. R. Ronning, & C. R. Reynolds (Eds.), *Handbook of creativity* (pp. 3–32). Plenum Press.
- Craft, A. (1999). Creative development in the early years: Some implications of policy for practice. *The Curriculum Journal*. 10, (135-150). DOI:10.1080/0958517990100110
- Byrgea,C. & Tang, C. (2015). Embodied creativity training: Effects on creative self-efficacy and creative production. *Thinking Skills and Creativity*, 16, 51-61. DOI: 10.1016/j.tsc.2015.01.002
- De Bono, E. (1983). The Direct Teaching of Thinking as a Skill. Education. Corpus ID: 146380725
- de Bono, E. (1985). The Practical Teaching of Thinking Using the CoRT Method. *Special Services in the Schools*, 3(1-2), 33–47. DOI:10.1300/J008v03n01_04
- De Bono, E. (1995). De Bono's Thinking Course. London: BBC Books.
- Feldhusen, J., & Goh, B. E. (1995). Assessing and Accessing Creativity: An Integrative Review of Theory, Research, and Development. *Creativity Research Journal*, 8(3), 231–247. DOI:10.1207/s15326934crj0803_3
- Guilford, J. P. (1950). Creativity. *American Psychologist, 5*(9), 444-454. https://doi.org/10.1037/h0063487
- Kaila, H. (2005). Democratizing schools across the world to stop killing creativity in children: An Indian perspective. *Counseling Psychology Quarterly*. 18, 1-6. DOI:10.1080/09515070500099728
- Kaufman, J. C. (2015). Why creativity isn't in IQ tests, why it matters, and why it won't change anytime soon probably. *Journal of Intelligence*, 3(3), 59–72. doi:10.3390/ jintelligence3030059
- Kim, K. H. (2011). The APA 2009 division 10 debate: Are the torrance tests of creative thinking still relevant in the 21st century. *Psychology of Aesthetics, Creativity, and the Arts*, 5(4), 302–308. https://doi.org/10.1037/a0021917.
- Kumari, S. (2014). The effect of creativity training programme on concept map performance of secondary school students. [Ph.D. Thesis]. Kurukshetra University]. INFLIBNET Centre. http://hdl.handle.net/10603/84467

- Lubart, T. I. (1994). Creativity. Thinking and Problem Solving, 289–332. doi:10.1016/b978-0-08-057299-4.50016-5
- Mackinnon, D. W. (1962). The nature and nurture of creative talent. *American Psychologist, 17*(7), 484–495. https://doi.org/10.1037/h0046541
- McGregor, D. (2007). Developing Thinking Developing Learning: A Guide to Thinking Skills in Education. Open University Press. McGraw Hills Education.
- Milbrandt, M. & Milbrandt, L. (2011). Creativity: What Are We Talking About? *Art Education,* 64(1), 8-13.
- Osman, R., Skuy, M., Cockcroft, K. & Fridjhan, P. (2000). Effects of the Instrumental Enrichment and CoRT Thinking Skills Programmes on the Creativity of Pre-service. *SAJHE/SATHO*, 14(3), 161-168. https://journals.co.za/doi/pdf/10.10520/EJC36772
- Pahuja, R. (2017). Effectiveness of thinking training programme on the basis of creativity of students of higher education in Fazilka district (Punjab) [Ph.D. Thesis, Panjab University]. INFLIBNET Centre. http://hdl.handle.net/10603/207226
- Parnes, S. (1970). Education and creativity. In: P. Vernon (Ed.), Creativity: Selected Readings. Penguin Books (pp. 341-354), Harmondsworth.
- Ponnusamy, P. (2019). Creativity of Student-Teachers with Reference to Their Gender and Locality. *Shanlax International Journal of Education*, 8 (1), 48–53.
- Renzulli, J. S., Owen, S. V., & Callahan, C. M. (1974). Fluency, flexibility, and originality as a function of group size. *The Journal of Creative Behavior, 8*(2), 107–113. https://doi.org/10.1002/j.2162-6057.1974.tb01117.x
- Rhodes, M. (1961). An analysis of creativity. *Phi Delta Kappan*, 42(7), 305-3 10.
- Runco, M. A. (2014). Cognition and Creativity. *Creativity*, 1 -38. doi:10.1016/b978-0-12-410512-6.00001-1
- Runco, M.A. (2011). Divergent Thinking. *Encyclopedia of Creativity*, 400–403. doi:10.1016/B978-0-12-375038-9.00077-7
- Runco, M. A., & Acar, S. (2012). Divergent thinking as an indicator of creative potential. *Creativity Research Journal*, 24(1), 66–75. https://doi.org/10.1080/10400419. 2012.652929
- Runco, M. A., & Vega, L. (1990). Evaluating the creativity of children's ideas. *Journal of Social Behavior and Personality*, 5(5), 439–452.
- Russ, S. W. (2002). Gender differences in primary process thinking and creativity. In R. F. Bornstein & J. M. Masling (Eds.), The psychodynamics of gender and gender role. Empirical studies in psychoanalytic theories (pp. 53–80). Washington, DC: American Psychological Association. https://doi.org/10.1037/10450-002
- Singh, V. (2001). Effect of thinking training programme (CoRT Strategy) on facilitation of creativity amongst tenth grade students [Ph.D. thesis, Devi Ahilya Vishwavidyalaya, Indore].
- Sternberg, R. (2005). Creativity or creativities? *International Journal of Human-Computer Studies*, 4–5(63), 370–382. doi:10.1016/j.ijhcs.2005.04.003
- Sternberg, J.S. (2006). The Nature of Creativity. *Creativity Research Journal*, 18 (1), 87–98.
- Torrance, E.P. (1965). Scientific Views of Creativity and Factors Affecting Its Growth. Source: Daedalus, Creativity and Learning, 94 (3), 663-681.
- Thomas, E. J., & Fink, C. F. (1963). Effects of group size. *Psychological Bulletin, 60*(4), 371–384. https://doi.org/10.1037/h0047169
- Torrance, E. (1970). Encouraging creativity in the classroom. Dubuque, IA: William C. Brown
- Wilson, R. C., Guilford, J. P., Christensen, P. R., & Lewis, D. J. (1954). A factor-analytic study of creative-thinking abilities. *Psychometrika, 19,* 297–311. https://doi.org/10.1007/BF02289230