A Literature Review on Over inclusive Thinking Training

Pranati Mishra[1]and Himansu Mohan Padhy[2]

[1,2] Institute of Technology Research Foundation, Ramachandrapur, Jatni, Khurda, Odisha

[2]hmp.sophi@gmail.com

***Abstract*—To regulate and support student learning it is important to recognize the importance of Over inclusive Thinking Training (OTT). Educational psychologists have been promoting the importance of OTT. Educators in most part of the country are not familiar with the methods for teaching and assessing OTT. Creativity is a process involving knowledge activation, remote association, divergent thinking and insight ability. To overcome the creative limitations it is required to develop non-rule-based training of creative thinking based on over inclusive thinking trainings which could directly strengthen the connections between knowledge nodes in the human brain. Teachers need to promote general awareness of OTT. Educators should emphasize the affective and motivational aspects of OTT. Most students may possess skills and knowledge, but fail to use them. Students should be prepared to succeed when they encounter challenging situations. In general they should be trained to use their effort and strategy. The purpose of this literature review is fourfold: (1) to explain the different ways in which OTT has been defined by researchers; (2) to show how over inclusive thinking develops in children and its challenges; (3) to learn how skills in students can be improved through OTT; and (4) to review best practice tests for OTT .**

Keywords— Over inclusive Thinking, training, creativity, educators, skills, students

1. INTRODUCTION:

The action of thinking produces thoughts. A thought can be an idea or an image, a sound or even an emotional feeling. It arises from the brain. Manipulating information is the process of thinking. We form concepts, engage in problem solving, reasoning and decision making ; all these are the acts of thinking. Sometimes the individual is unable to think in a precise manner as they have inability to keep irrelevant elements out of the perceptual boundary. This is known as over inclusiveness or over inclusive thinking. However training and practice tests can improve the creativity of the students having over inclusiveness. Disorders of thought process include a disturbance in the way some formulate the thoughts. It is the process in which someone comes up with their thoughts. Thought disorders usually inferred from speech. They are called "disorganized speech." Historically, thought disorders are of different types known as associative loosening, illogical thinking, over inclusive thinking, and loss of ability to engage in abstract thinking [1].

2. OVER INCLUSIVE THINKING TRAINING AS DEFINED BY RESEARCHERS:

Over inclusive thinking is the inability to narrow down the operations of thinking and bring into action the organized attitude and specific responses relevant to task at hand [1]. Over inclusive thinking training improves creative performance. Participants have to classify items into untypical categories. This type of training requires participants to classify an item into a certain category through active thinking. There is a procedure of classifying unrelated items into a category, it loosens the boundaries of knowledge concept categories and develops students ability to engage in over inclusive thinking.

When words with long semantic distances are classified into one category, the effect on creativity enhancement was likely to be substantial because an extensive degree of OTT was achieved. For example, long-distance semantic OTT may require classifying fruit-related words and furniture-related words into a category. Conversely, short-distance semantic OTT requires classifying words with short semantic distances into a category, such as fruit-related and vegetable-related words.

To investigate the effect on creative insight the following should be employed:

- Long-distance semantic OTT,
- Short-distance semantic OTT and
- Control group.

Creativity is considered as a process involving knowledge activation ,remote association, divergent thinking and insight ability.

Divergent thinking is defined as the ability to produce numerous diverse creative ideas and developed an alternative uses test that can be used to examine participants' divergent thinking and includes fluency, originality, and flexibility indices. Fluency refers to the ability to create substantial number of ideas, originality refers to the ability to generate novel ideas, and flexibility refers to the ability to produce multiple conceptual categories [2].

The divergent thinking test is used to measure divergent thinking responses .However, divergent thinking tests do not include specific solution objectives; consequently, solution appropriateness is not considered.

To overcome the disadvantage of divergent thinking tests in that they do not emphasize response appropriateness, we used insight problems that focus on solution appropriateness to measure creativity (i.e., creative insight problems combine divergent elements with convergent elements).

3. OVER INCLUSIVE THINKING TRAINING AND ITS CHALLENGES:

The effectiveness of creativity training according to Scott, Leritz, and Mumford (2004), show that the results of meta-analysis regarding the effectiveness of training of the creativity. It infers that the proper instruction of creative skills and rules is an important factor of effective creativity training. Many explicit skills for improving the creativity have been proposed, such as the association skill (Cheng et al., 2010;Gruszka & Necka, 2002; Piers & Morgan, 1973). The creative problem solving (Parnes, 1962), cognitive stimulation (Fink et al.,2010), divergent thinking (Fleith et al., 2002; Runco, 1991), conceptual combination (Kohn, Paulus, & Korde, 2011), Synectics(Gordon, 1961). The future thinking (Chiu, 2012); instruction on how to be creative (Nusbaum et al., 2014), improvisation (Lewis& Lovatt, 2013), and representation change (Patrick & Ahmed, 2014). These skills provide rules for students to apply to be able

to perform creative thinking. The people are in a state of controllable consciousness and awareness when they apply these creativity skills (Dorfman, Shames, & Kihlstrom, 1996). But by giving effort and using the creative skills might hamper the search for new ideas (Zhong et al., 2008); as they found that in unconscious state participants were not focused when taking the Remote Associates Test(RAT). As compared to conscious thought, the unconscious thought increased the accessibility of RAT answers. This showed that when participants were searching methods to achieve problem-solving objectives, creativity can be hampered. In case of working memory (WM), when a person is busy in two cognitive tasks at the same time, the WM's performance activity diminishes in carrying out the main operation (Lorist, Boksem, & Ridderinkhof, 2005). Retaining novel data in and discriminating between relevant and irrelevant information are crucial WM processes (Unsworth & Engle, 2007). The study conducted by De Dreu et al. (2012) showed that when participants were made to complete RAT item, they were also asked to remember low load or few high load digit strings. After the task, the participants were asked to recall all the strings. The results proved that participants in low-load conditions performed better than those under high-load conditions [2-19].

In order to describe the thinking pattern of schizophrenic patients the concept of overinclusive thinking was first proposed by Cameron [1]. Overinclusive thinking is considered as a personality trait. It is the inability in thinking process to preserve conceptual boundaries (Andreasen & Powers, 1974). People who have overinclusive thinking have a broader conceptual framework. Overinclusive thinking can be called as increased generalization (Eysenck, 1993, 1995) [20-22].

4. How skills in students can be improved through OTT:

Different experiments conducted by researchers is given below :

4.1 Experiment 1:

There was an independent variable group. It consisted of control group and OTT. A dependent variable was formed consisting of the students' performance in conducting the categorization work. As the conceptual boundaries will not be maintained in case of overinclusive thinking (Andreasen & Powers, 1974), the people with high overinclusive thinking ability were made to evaluate in the typical category [20]. They classified non typical and prototypical examples into the same category. Participants with high overinclusive thinking perceive ambiguous boundaries within categories. Thus they show increased category inclusiveness. In this experiment, overinclusive thinking was measured by using the categorization work (Isen & Daubman, 1984) [23]. If the participants had a high tendency to classify non-typical samples into a typical concept category, they were described to demonstrate a high level of overinclusive thinking.

4.2 Experiment 2:

According to previous study, manipulating overinclusive thinking can result in better creativity (Chrysikou, 2006; Wen et al., 2013).In Experiment 2, the training for both groups was the similar as that used in Experiment 1. However dependent variable was changed from overinclusive thinking to creativity. Divergent thinking is said to be a important part of creativity (Guilford, 1967). Thus the divergent thinking task was used to measure creativity. Also previous research work have demonstrated that variables such as positive emotion (Lyubomirsky, King, & Diener, 2005), motivation(Amabile, 1996), and interest (Hirt, Melton, McDonald, & Harackiewicz, 1996) may influence creativity. Such variables were measured after the training for examining whether the manipulation of Experiment 2 affected the three variables . Whether

it validated the confounding variables and diminished the validity of Experiment 2. In this experiment, the single-item questionnaire proposed by Friedman and Förster (2000, 2001, 2002, 2005) was used to measure the three variables [24-33].

4.3 Experiment 3:

To categorize examples from two unrelated categories into one category as in Experiments 1 and 2, was said to be the long-distance semantic OTT task; and the manipulation of the short-distance semantic OTT task included categorizing examples from two relatively similar categories into one. A long-distance semantic OTT consisted of categorizing examples from two long-distance semantic categories into one category. But the short-distance semantic OTT involved categorizing examples from two short-distance semantic categories into one category. In addition, the task given to the control group was identical to that performed in Experiments 1 and 2. Experiment 3 examined the influence of OTT on the betterment of insight problem solving. It also found the difference between the effects of the short- and long-distance semantic OTT [34].

4.4 Experiment 4:

the creative thinking tests were administered 7days after the training to find the delayed effect that OTT had on the betterment of creativity. Experiments 2 and 3 only found out the immediate effect of training as the participants were made to complete creative work immediately after training. Therefore, the results of these experiments cannot validate the delayed effect of OTT. To investigate the effect of OTT after a delay of 7 days, Experiment 4 was done by using the same two-group training design and the creative thinking test employed in Experiment 2. The difference between Experiments 4 and 2 was the administration time of the creative thinking task. Experiments 2 to 4 revealed that OTT enhances creativity [34].

5. PRACTICE TESTS FOR OTT :

In Experiment 1 there were 40 undergraduates and they were randomly absorbed into the OTT group or the control group. After the training they were asked to complete categorization tasks. The results showed that the OTT enhanced their ability to engage in overinclusive thinking. In Experiment 2 there were 42 undergraduates and they were randomly given the OTT group or the control group. After the training they were required to take up the Creative Thinking Test. It showed that the performance of the OTT group regarding fluency and originality was better than that of the control group. In Experiment 3 there were 56 undergraduates and they were randomly assigned to three groups: the control group, the long-distance semantic OTT group and the short-distance semantic OTT group. After the training they were asked to solve insight problems. The results showed that the presentation of the long-distance semantic OTT group in insight problem solving was way superior to that of the short-distance semantic OTT and the control group. In Experiment 4 there were 50 undergraduates and they were randomly assigned to the OTT group or the control group. The Creative Thinking Test was done after a gap of 7 days after training. The results show that the training effect on originality was maintained; but no effect was observed on either fluency or flexibility [34].

An experimental psychologist set up the work process of making a pendulum. Subjects were taken to a table which had a pendulum-weight with a cord attached on it, a nail and some other items. The psychologist described the experiment and the working of a pendulum. Then the students were asked to hang the

pendulum on the wall. There was a nail on the table but there was no hammer. Most of the students were perplexed and unable to complete the task as they could not figure out how to do the task without a hammer [35].

Next, another set of students were given the same job under slightly changed conditions. The cord was placed separately, and the word pendulum-weight was not said to them. The psychologist did not show the movement using the pendulum with the cord. He asked the participants to hang the pendulum on the wall. All the participants accomplished the work. They looked at what was available. Then realized there was no hammer and thus considered all of the items to see what they could use to attach the nail on the wall. They used the pendulum-weight to pound in the nail. Then they tied the cord and the weight to the cord [35].

The first group failed as the weight was firmly fixed in its role as a pendulum-weight and nothing else. This had been verbally described and visually it formed a unit. The visual classification of the weight-attached-to-cord as well as the verbal proposal of their trainer made it impossible for them to change their perception of a pendulum-weight into a hammer. Exclusive thinking made them restricted to use a hammer and as it was not present on the table they couldn't accomplish the task [35]..

The second group had not been proposed to think of the cord and weight as a single unit. Inclusive thinking made them creative and use anything available as a pounding object.

When most of us look at different shapes, we automatically fixate on our past instances to see if we have encountered something similar before. If we find similar instances, we then select the most appropriate past approach, neglect all others, and apply it to the problem solving process. If we find no similar instances in our past, we by default do the easiest process [35].

The exclusive thinkers usually think reproductively. If they find nothing from their past they infer that it can't be solved. But inclusive thinkers would be driven by their natural curiosity to find the unseen message by looking at the data or problem in many different angles.

6. CONCLUSION

Creative thinking is improved due to inclusive thinking. In case of inclusive thinking one considers the least evident as well as the most likely approach and they look out for different ways to handle the problem. It is the effort to explore all approaches even after one has found a promising one.

Most of the people have been educated to have a thinking pattern that is exclusive. This process is deficit as it focuses our attention on specific data and makes us exclude all else. Exclusive thinking is good when we know exactly which information is needed and what is not. In many cases most of the information's are ambiguous. In these situation exclusive thinking leads to the negligence of important pieces of the data. Exclusive thinking inhibits irrelevant facts and perceptions and it can also smother the imagination. Therefore over inclusive thinking training is required.

ACKNOWLEDGMENT

We duly acknowledge the output published in this paper as the outcome of DST sponsored project.

REFERENCES

[1] Cameron. N. , "Experimental analysis of schizophrenic thinking," in J. S. Kasanin (Ed.), Language and thought in schizophrenia , New York:Norton , 1944, pp. 50–64.
[2] Scott. G., Leritz. L. E., & Mumford. M. D., " The effectiveness of creativity training: A quantitative review," Creativity Research Journal, 2004, 16(4), pp. 361–388.
[3] Gruszka. A., and Necka, E., " Priming and acceptance of close and remote associations by creative and less creative people," Creativity Research Journal, 2002,14, pp. 193–205.
[4] Piers. E. V., and Morgan. F. T, " Effects of free association training on children's ideational fluency," Journal of Personality, . 1973, 41(1), pp. 42–49.
[5] Parnes. S. J. , " Can creativity be increased?," in S. J. Parnes, & H. F. Harding (Eds.), a source book for creative thinking , 1962 , pp. 185–191.
[6] Fink. A., Grabner. R. H., Gebauer. D., Reishofer. G., Koschutnig K., and Ebner. F. ," Enhancing creativity by means of cognitive stimulation," NeuroImage, 2010, 52(4), pp. 1687–1695.
[7] Fleith. D. S., Renzulli. J. S., and Westberg K. L. , "Effects of a creativity training program on divergent thinking abilities and self-concept in monolingualand bilingual classrooms, " Creativity Research Journal, 2002, 14, pp. 373–386.
[8] Runco. M. A. , " Divergent Thinking, " Norwood, NJ: Ablex, 1991.
[9] Kohn. N. W., Paulus. P. B., and Korde. R. M. , " Conceptual combinations and subsequent creativity," Creativity Research Journal, 2011, 23(3), pp.203–210.
[10] Gordon. W. , " Synectics: The development of creative capacity," New York. NY: Collier, 1961.
[11] Chiu. F. C. , " Fit between future thinking and future orientation on creative imagination," Thinking Skill and Creativity, 2012, 7,pp. 234–244.
[12] Nusbaum. E. C., Silvia. P. J., and Beaty. R. E. , ". Ready, set, create: What instructing people to be creative reveals about the meaning and mechanisms of divergent thinking, " Psychology of Aesthetics, Creativity, and the Arts, 2014.
[13] Lewis. C., and Lovatt, P. , "Breaking away from set patterns of thinking: Improvisation and divergent thinking," Thinking Skills and Creativity, 2013, 9, pp. 46–58.
[14] Patrick. J., and Ahmed. A. , "Facilitating representation change in insight problems through training," Journal of Experimental Psychology: Learning, Memory,and Cognitionl, 2014, 40(2), pp. 532–543.
[15] Dorfman. J., Shames. V. A., and Kihlstrom. J. , "Intuition, incubation, and insight: Implicit cognition in problem solving," In G. Underwood (Ed.), Implicitcognition, 1996, pp. 257–296.
[16] Zhong. C. B., Dijksterhuis. A., and Galinsky. A. D. , " The merits of unconscious thought in creativity," Psychological Science, 2008, 19(9), pp. 912–918.
[17] Lorist. M. M., Boksem. M. A., and Ridderinkhof. K. R., "Impaired cognitive control and reduced cingulate activity during mental fatigue," Cognitive BrainResearch, 2005, 24(2), pp.199–205.

[18] Unsworth. N., and Engle. R. W. , "On the division of short-term and working memory: An examination of simple and complex spans and their relationto higher-order abilities," Psychological Bulletin, 2007, 133, pp.1038–1066.

[19] De Dreu. C. K., Nijstad. B. A., Baas. M., Wolsink. I., and Roskes. M. , " Working memory benefits creative insight, musical improvisation, and original ideation through maintained task-focused attention, " Personality and Social Psychology Bulletin, 2012, 38(5), pp. 656–669.

[20] Andreasen. N. J., and Powers. P. S., "Overinclusive thinking in mania and schizophrenia," British Journal of Psychiatry, 1974, 125, pp. 452–456.

[21] Eysenck. H. J. , "Creativity and personality: Suggestions for a theory," Psychological Inquiry, 1993 , 4, pp.147–178

[22] .Eysenck. H. J., "Genius: The natural history of creativity," New York. NY: Cambridge University Press, 1995.

[23] Isen.A. M., and Daubman. K. A., " The influence of affect on categorization," Journal of Personality and Social Psychology,1984, 47, pp. 1206–1217.

[24] Chrysikou. E. G. , "When shoes become hammers: Goal-derived categorization training enhances problem-solving performance," Journal of ExperimentalPsychology: Learning, Memory, and Cognition, 2006,32(4), pp.935.

[25] Wen. M. C., Butler. L. T., and Koutstaal.W. , "Improving insight and non-insight problem solving with brief interventions," British Journal of Psychology, 2013, 104(1), pp. 97–118.

[26] Guilford. J. P. , " The nature of human intelligence, " New York, NY: McGraw-Hill, 1967.

[27] Lyubomirsky.S., King. L., and Diener. E. , "The benefits of frequent positive affect: Does happiness lead to success?, " Psychological Bulletin, 2005, 131, pp. 803–855.

[28] Amabile. T. M. , " Creativity in context, " Boulder, CO: Westview Press, 1996.

[29] Hirt. E. R., Melton. R. J., McDonald. H. E., and Harackiewicz. J. M. ," Processing goals, task interest, and the mood-performance relationship: A mediational analysis," Journal of Personality and Social Psychology, 1996, 71, pp. 245–261.

[30] Friedman. R., and Förster. J," The effects of approach and avoidance motor actions on the elements of creative insight, " Journal of Personality and Social Psychology, 2000, 79, pp. 477–492.

[31] Friedman. R. S., and Förster. J. ,"The effects of promotion and prevention cues on creativity," Journal of Personality and Social Psychology, 2001 81, pp.1001–1013

[32] Friedman. R., and Förster. J. ,"The influence of approach and avoidance motor actions on creative cognition," Journal of Experimental Social Psychology, 2002, 38, pp. 41–55.

[33] Friedman, R., and Förster, J. , "The influence of approach and avoidance cues on attentional flexibility," Motivation and Emotion, 2005, 29, pp. 69–81.

[34] Fa-chung Chiu, " Improving Your Creative Potential without Awareness: Overinclusive Thinking Training Article in Thinking Skills and Creativity , " November 2014.

[35] Michael Michalko, " Why Creative Thinking is Inclusive Thinking," syndicated from psychologytoday.com, Aug 03, 2012.