

EFFECT OF A COGNITIVE TRAINING PROGRAMME ON SECONDARY SCHOOL STUDENTS' CREATIVE THINKING SKILL

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Abstract

The study examines the effect of a Cognitive Research Trust training programme on secondary school students' creative thinking skill. The sample consisted of 142 subjects. Of this number, 72 were experimental while 70 were for control groups. Two hypotheses guided the study. Instrument used for data collection was Creative Thinking Test (CTT). Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The findings revealed significance difference in the mean performance in favour of the experimental group. The findings have also shown that female students performed significantly better than the male students on creative thinking test.

Introduction

In the beginning, human problems were not as varied and complex as they are today. Constant changes at the individual, social, economic, educational, political, and business levels of the society have generated many problems which require creative ideas for solution (Akinboye, 2004). Harris (2002) opines that creative thinking that is out of the

ordinary is to be used in order to contend with the changes in the society.

According to Boulden (2002), creative thinking is acceptable ideas and ways of doing things in order to find new solutions or concepts. Be aware of the obstacles that stand in the way of the creative impulse and understand the benefits that creative thinking can bring. To Harris (2002), creative thinking is a systematic problem-solving tool. To Akinboye (2004), creative thinking is the most fundamental of all human resources and skills. This is because the quality of thinking determines the quality of human future. Creative thinking enables human beings to get the most out of experiences and resources. It also propels organizations, catapults careers, and generates potent growth. Without creative thinking, man is not able to make use of information and resources available.

Snell (2000), notes that creative thinking contributes to the acquisition of information, and is essential in the application of knowledge to personal and professional problems. He adds that countries that invested in their creative potentials have achieved a lot of economic and technological growth, wealth and development. If not applied, it will suppress creative desire, which is inborn. It may also lead to actual breakdown of personality and development. Similarly, Akinboye (2003), remarks that a basic principle of development is the empowerment of citizens of a society through constructive and creative thinking. Arinzechukwu (2007), asserts that creative thinking is called for when scheduling meetings, planning for tourism, any form of writing, and establishment of relationships

Generally speaking, Osborn (1999), maintains that all professions call for creative thinking. For instance, the practice of medicine is a continual challenge to creative thinking. Doctors who serve children have a special need for imagination in relating to their patients. Lawyers certainly have to think up strategies and foresee what their adversaries will say. In the military profession, strategies and tactics all depend on creative thinking. Farmers also could feel similar impact of creative thinking. A creative farmer would not only produce in large quantity, but would also make sure his farm produce is qualitative. This suggests that the most important thing any country

can do to assist the development of her citizens is to teach them creative, innovative, and constructive thinking.

There are a number of personality traits that are associated with creative thinking. Akinboye (2003), notes that creative people are sensitive to aesthetic stimuli and beauty in man, and their nature. They also appreciate the beauty man has made and think of different ways of appreciating situations. They do not hide their emotional feelings about a thing or situations and are usually outwardly expressive of what they have to say. Baron (1969), looks at creative individuals as free to see the world in unconventional ways. Whatever their outward appearance may be, they are nonconformists in their thinking, and they are often so in behaviour, and they are quite likely to disregard social rituals. They would rather spend their time in creating something than in playing social games.

Crutchfield (1961), found creative people to be more flexible and fluent, and more unique in perception, cognition, beauty, analytical, and perceptually open than the general population. Cattell (1959), using a factorial analytic approach discovered that creative individuals demonstrated ego, strength, dominance, self-sufficiency, sensitivity, introversion and radicalism. Mackinnon (1965), using California Psychological Inventory (CPI) found that creative architects emerge as self-confident, aggressive, flexible, self-accepting, little concerned with social restraint or others opinions, and strongly motivated to achieve primarily in those situations with independent thought and action rather than conformity. According Mackinnon, highly creative people stress their inventiveness, assertiveness, independence, perceptiveness, individuality and determination. Being more self-accepting, creative people are able to speak frankly and in an unusual way about themselves. Their openness allows them to struggle with the opposite nature, strive for a more effective reconciliation, tolerating increasing amounts of tension as they strive for creative solution to problem.

Creative thinking involves a set of learnable programmes for working with ideas and solving problems. One of the programmes is Cognitive Research Trust (CoRT). According to De Bono (1995), this programme is a package that is designed specially for use in direct

teaching of creative thinking skill in schools. CoRT provides a framework where emphasis is placed directly on thinking. It also offers a selection of specific and deliberate thinking skill. It is now widely in use in Australia, Canada, New Zealand, Japan, United States of America, South Africa, Italy, United Kingdom, Philippines, and Russia. It was first written in 1974 and revised in 1993, 1994, and 1995. It teaches creative thinking skill through the use of thinking tools in a formal, focused and deliberate manner. The aims of CoRT training programme are:

- To provide a framework where emphasis is placed directly on teaching thinking.
- To encourage students to view thinking as a skill that can be learnt and practiced to see their own improvement in confidence, fluency and focus.
- To encourage students to learn specific thinking skill that can be transferred to other situations.

CoRT training programme is in six groups of ten lessons. These groups include: Breadth, organization, interaction, creativity, information and feeling, and action. Evidence abound that Cognitive Research Trust training programme has been useful in fostering creative abilities in students. For example, a study was carried out by Edward and Clayton (1989), on the effect of teaching a group of 12 - years old in their last year of primary school. All sixty (60) lessons of the CoRT programme (two lessons a week for thirty weeks. Both the teacher and the headmaster, who regularly took the class, reported impressive benefits. The teacher discovered that her teaching style became more interactive. She now uses group work more often and she knew her students and their thinking at a much deeper level than ever before in thirteen years of teaching. The headmaster confirmed the teacher's observations and noted that students exhibited more responsiveness and more confidence in their thinking than any group he had taught.

Creative thinking is also influenced by gender. There is consistent evidence on gender studies that in many cultures men and women differ (Schuilkin, 1999). For example, some scholars of Idoma

studies like Ode (2002), Okpeh (1999), have variously confirmed that, men seem to think more creatively than women. Those women do not possess enough quotient of intelligence to receive and critically process information and arrive at meaningful decision. In this way, the men think that they need to watch and guide the women all the time

According to Ortner (1990), girls are often treated as inferior and are socialized to put themselves last, thus, undermining their self-esteem. This discrimination against girls starts from the earliest stage of life through childhood and into adulthood. Discrimination and neglect in childhood can initiate a lifelong deprivation and exclusion from the social main stream. In many cases, girls start to undertake heavy domestic activities at a very early age and are expected to manage both educational and domestic responsibilities, often resulting to poor scholastic performance and an early dropout from school.

A report from world conference on women 1995 has also shown that the percentage of girls enrolled in secondary schools remain insignificantly low in many countries of the world. Girls are often not encouraged or given the opportunity to pursue scientific and technological training and education which limits the knowledge they require for daily lives, employment opportunities and their contributions to the challenges of the 21st century. The report also revealed that women are less encouraged than men to participate in the social, economic and political functioning of the society, with the result that they are not offered the same opportunity as men to take part in decision-making process. With this stereotype in the society, not all her members will be able to express their creative abilities.

It is established that in most cultures, women are not allowed to take part in social, economic and political functioning of the society, yet advance in science and technology pose new problems for individuals and society. Whether an individual likes it or not; whether an individual chooses to be a mute spectator or an active participant, the fact remains that his environment is changing. Under this changing condition, simple conformity to the past may lead to unresolved problems. The changes therefore, place a lot of challenges on the individual's ability to think and make meaning out of his rapidly changing society. Despite this challenge, conventional method is still

the major means of enhancing creative thinking ability that is inherent in a normal classroom interaction.

There is obviously the need to foster creative thinking in every human being. However, in all developing societies like Nigeria, women seem to be undervalued. They have fewer opportunities to express their creative abilities. Thus, the females developed low-self esteem. In most ages, girls fall behind boys in the classroom. Would training have a different meaning for female students because their roles in the society are different from that of the boys?

Purpose of the Study

The main aim of the study is to determine the effect of a Cognitive Research Trust CoRT.5 training programme on secondary school students' creative potential. Specifically, it sought to:

1. Determine the difference in the mean performance between experimental and control groups based on creative thinking test.
2. Ascertain if there is difference in the mean performance between male and female students based on creative thinking test.

Hypotheses

The following hypotheses are formulated to guide the study:

1. There is no significant difference in the mean performance between the experimental and control groups based on creative test.
2. There is no significant difference in the mean performance between the male and female students based on creative thinking test.

Design of the Study

A Quasi-experimental design was used for the study. The population of this study consisted of all 15, 327 SS II students in 235 secondary schools. Simple random sampling was used to select four secondary schools. In each of the school, an arm of SSII students was selected simple random sampling. One hundred and forty-two students

constituted the sample. Out of this number, seventy-two students from two schools formed the experimental group, while seventy from the other two schools formed the control group. The instrument used for data collection was Creative Thinking Test. The researcher adopted Cognitive Research Trust (CoRT.5) training programme by De Bono as an instructional programme for the study.

Experimental Procedure

Week 1: The researcher visited sampled schools to enable her introduce herself to staff of the schools and to seek for support. In these schools, some teachers were trained as research assistants.

Week 2: In the second week of the training, each research assistant was asked to stand before the researcher, and teach the programme. The essence of the teaching was to see that necessary corrections are affected, also to see how each assistant will prove mastery of the skills involved in what they are trained on.

Week 3: The researcher met with the students. In this meeting, the researcher delivered a short address on creative learning and teaching intact classes were selected, and research assistants administered Creative Thinking Test (CTT) on both subjects. Thereafter, the experimental group was subjected to training of creative thinking skill. The control group only depended on conventional method of enhancing creative thinking skill in a normal classroom interaction. From weeks 4-12, research assistants taught all the lessons. After the treatment, creative thinking test was administered again to the two groups.

Results

Table 2.1: One-way Analysis of Covariance (ANCOVA) of Student's Scores on Creative Thinking Test (CTT) by Group.

Source of variation	Sum of squares	Df. square	Mean	F. Ratio	Sig.	Decision at 0.05
Pretest	31.268	1	31.268	276	600	NS
Group	336312.080	1	336312.080	974 296	000	S
Error	15732.310	139	113.182			
Total	291275.000	142				

*S=Significant at 0.05 level

**Not significant at 0.05 level

In order to test hypothesis one, a one-way Analysis of Covariance (ANCOVA) is used as shown in table 1 to compare the effectiveness of Cognitive Research Trust (CoRT) on treatment and control groups. The independent variable was CoRT training programme and the dependent variable was scores on Creative Thinking Test (CTT) administered after the intervention was completed. Participants' scores on the pre- intervention administration of the test were used as the covariate in this analysis. After adjusting for pre- intervention scores, the result indicates that there is significant difference in the mean score of treatment and control groups on Creative Thinking Test, $F(1,139) = 296.974$, $P = .0005$.

This suggests that there is no strong relationship between the pre-intervention and post-intervention on Creative Thinking test. Given this effect, it is not surprising that creative thinking skill leads to exploration of novel, original and new ideas for problem solving. Thus, the null hypothesis of no significant difference in the mean performance between experimental and control groups based on creative thinking test is rejected.

Table 2.2: A two-way Analysis of Covariance (ANCOVA) of Students Scores on CTT by Group and Gender.

Source of variation	Sum of squares	Df	Mean squares	F. Ratio	Sig	Decision at 0.05
Pretest	22.130	1	22.130	.205	.651	
Group	33313.560	1	33313.560	308.673	.000	S
Sex	566.420	1	566.420	5.248	.023	S
Group/sex	353.777	1	353.777	3.279	.072	NS
Error	14785.733	137	107.925			
Total	291275.000	142				

*S=Significant at 0.05 level

**N=not significant at 0.05 level

In order to test hypothesis three, a two-way Analysis of Covariance (ANCOVA) was used as shown on Table 4. The results indicate that there is significant difference in main effect of Cognitive Research Trust training programme on females and males in the experimental group with $F(1,137) = 308.673$, $P = 0.5$. The results revealed that females performed significantly better than the males in creative thinking test with $F(1,137) = 5.248$, $P = .023$ (less than .05). Therefore, the hypothesis, which states that there is no significant difference in the mean performance between the males and females on creative thinking test, is rejected.

Discussion

The results have shown that Cognitive Research Trust training programme is a credible tool for enhancing creative thinking skill. The findings agree with the findings of Osborn (1999), who reported that removal of blockages by creative thinking training increases one's creative performance. The findings study could be related to the results obtained by Akinboye, (1976), Owolabi, (1988), and Olagunji, (1990) who reported that trained subjects performed better than the untrained subjects. In another study, Vangudy (1999), found that his study of a five-week exposure of Cognitive Research Trust training programme,

produced positive results as it was rated as being worth doing and as having positive effect on the students' thinking skill.

The findings of the study are also consistent with that of Edward and Clayton's (1989) findings on effect of teaching a group of 12 years old, in their last year of primary school. All the sixty (60) lessons of Cognitive Research Trust training programme were taught. They reported that the teacher who regularly took the class noticed impressive benefits. In the finding, she discovered that the teaching style became more interactive. The headmaster of the school also confirmed the teacher's observation and noted that the students were more confident in their creative abilities than any group he had taught. The finding is similar to research findings reported by Black (1992) that graduate students of creative problem-solving problems classes at University of Buffalo were paired against comparable students who had not had these classes. The treatment class emerged ninety-four (94) percent better than those who received the conventional method to produce fresh and useful ideas.

The prevalence of experimental group in creative thinking test could be that the method emphasized repetition, and incorporated review and encouraged that the students should reach mastery level before advancing to the next task. It could also be due to the fact that the treatment groups were provided with the relevant materials, activities and careful step-by-step procedure. This could have given them the opportunity to employ investigative processes of learning and interaction with class members. This could also facilitate their understanding and retention of what has been taught. It could also mean creative thinking is a teachable and learnable skill.

Findings obtained in the present study indicate that there are statistically significant differences between males and females on creative thinking performance. The females performed better than the males. The findings are consistent with the findings of Kim and Michael (1995), which revealed that the Korean High School females had exhibited a higher average level of performance on Verbal Visual Creativity Test than the males.

The findings of this study also agree with Osborn's (1999) findings that most housewives work out their imaginations more than

most husbands do. That the man's job is usually routine, while the woman is on her own, almost every hour of the day. The finding is also consistent with that of Magenson (1985), which revealed that when wartime workers were thinking up so many ideas, women won the limelight. For example, Bernice Palmer was featured in life for having thought up to eight devices to speed up production of engine parts

Another study carried out at a class in creative thinking for high school seniors, revealed that girls showed forty (40) percent superiority in fluency of ideas over boys (Tucker, 1996). In another study, Osborn (1998), reports that in the course of more than one thousand brainstorm sessions with the firm of Batten, Barton and Durstine, women consistently averaged more ideas than their male counterparts.

A critical look at the result reveals that the females had a significant edge over the males. This finding is surprising because the consistent evidence on gender studies have shown that males performed better than the females. One possible reason why the females performed better than the males could be that men and women are similar in cognitive ability than they are in other areas. This is in line with the findings of Stumpf and Stanley (1998), who reported that there are no gender difference in achievement and many school subjects, from English literature to psychology, but there are some areas in which women excel and others men excel. On the average, women perform better than men in a range of language skill, verbal and fine motor skill. Whereas, men perform better than women in Mathematics and social studies. Yet most of these gender differences are quite small.

Agreeing with the view Friedman and Schustack (1999) add that too often when gender differences are found, they are magnified. For example, a researcher might report a study that 84 percent of men had high achievement expectation, while only 77 percent of women did, and go on to talk about the differences in their achievement expectation. In reality, this might be a small difference that would disappear if the study were repeated

A similar research finding is reported by American Association of University Women (SSUW, 1991), which revealed that for elementary students, gender differences in science achievement test

grade do not exist. Gender differences only begin to emerge in the middle school, and become solidified at a higher level. Brusselman - Dehairs and Henry (1994) also found out that differences in results in sciences according to gender are more important at the higher level than at the lower level. This differences they further stated that are consistently greater at the end of schooling.

Another reason could be that, females are only inferior to males in musculation, but not in imagination. In fact, the Johnson O' Foundation in Osborn (1998), reported that from 702 creative aptitude test that the women average was twenty-five (25) percent higher than that of males. The females' prevalence could suggest that they actually prepared well. Therefore, their success could be attributed to hard work. But men attribute their success to intelligence ability

It could also be attributed to the fact that the male students were more inclined to conventional method or to their roles in and out of the classes, even though the test instruction asked the students to make their work as clear and unusual as possible. It could also be that the females were so curious to use creative thinking skill in problem solving.

Conclusion and Recommendations

Based on the findings of this study, the following conclusions are drawn and recommendations made:

1. Creative thinking as a process could be significantly improved by stimulation with some appropriate thinking tools in a conducive and rewarding environment.
2. The findings recorded a significant difference in the mean performance between the males and females on creative thinking test. The females performed better than the males. In spite of this difference, there is an improvement in creative thinking skill of the males.

Hence the results of the study have shown that:

1. Exposure of students to Cognitive Research Trust training programme improved their creative thinking skill, emphasis should therefore be on equipping students with necessary

creative thinking techniques by their teachers and parents in an environment that is rewarding and conducive.

2. Men and women should work together with the children and youth to break down general gender stereotype taking into account that creative thinking potentials are found in all children irrespective of sex.
3. Federal and states Ministries of Education as well as schools should embark on organizing seminars, workshops and conferences on the importance of creative thinking skill. This is necessary because some practicing teachers may not be familiar with creative thinking techniques. Again, creative thinking should become a teaching subject in Nigerian secondary school education system.
4. There is also a great need for Nigerian psychologists, creative thinkers, and counsellors to devote more time to developing more tools that can be used in identifying several aspects of creative abilities, and enhancing them.

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