IMPACT OF TEACHER CREATIVITY FOSTERING BEHAVIOUR ON STUDENTS' ACADEMIC ACHIEVEMENT IN BIOLOGY IN ENUGU STATE, NIGERIA

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ABSTRACT

This study examined teacher creativity fostering behaviour and academic achievement in Biology among senior secondary school students in Enugu State, Nigeria. A total of 270 SS1 biology students (135 males and 135 females) from 10 public co-educational schools and 25 SS1 biology teachers participated in the study. They were selected through stratified and purposive sampling techniques respectively. The instruments used for data collection were Teacher Creativity Fostering Behaviour Index (TCFBI), Biology Achievement Test (BAT) and Eysenck General Intelligence Test (EGIT-4). Three research questions were posed while three hypotheses were formulated to guide the study. Analysis of covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. Eysenck General Intelligence Test was considered a covariate. Results showed that majority 14 (58.33%) of biology teachers do not foster creativity in teaching Biology. Students who were taught by teachers of high creativity fostering behavior had significantly better academic achievement in biology than those students taught by teachers of moderate and low creativity levels. There was no significant gender difference in students' academic achievement in Biology based on teacher creativity fostering behaviour. It was recommended that favourable climate and conducive working atmosphere be put in place to ensure effective process of teaching and learning Biology using TCFB.

KEYWORDS: Creativity Fostering Behaviour, Academic Achievement, Biology & Teacher

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INTRODUCTION

In recent times, most developing nations are striving to improve on the study of science subjects in their schools in order to promote the development of scientific and technological skills among students. Okoye (2004) has remarked that most African countries including Nigeria have remained with underdeveloped economy largely because of unsatisfactory state of science education. Biology is one of the science subjects which is very essential in science and technology, especially in the area of manufacturing and processing, food production, and pharmaceuticals among others (Nwagbo & Okoro, 2012; Okoro, 2018). Of major concern to educationists, however, is the development of innovative teaching methods that will enhance greater achievement among students in biology. That is why, perhaps, interest has to be shifted from traditional teaching to application of imaginative and creative approaches in teaching biology. Creativity has to do with the ability to generate multiple and unique solutions to a problem. It is an act of bringing into being something which does not exist before either as a process, a product or a thought. Creativity is thus connected with intellectual activity, knowledge, and thinking styles since it is a mental process involving the generation of new ideas that may involve being visionary, resourceful, original, inspirational and imaginative. A creative individual exhibits such qualities as flexibility, tolerance to ambiguity or unpredictability (Franken, 2014) and demonstrate original ideas and insights (Njoku, 2015). They are always

motivated because they see the need for novel, varied and complex stimulations.

The use of creativity in teaching and learning has been emphasized from many sources, especially in developed nations (Olatoye, Ogundoyin & Ogunsonya, 2010; Soh, 2015). For example, the European Council (2009) has recognized creativity as the core of learning process with increased view of creativity as an innovative process that is stimulating and supportive to learner's motivation and enthusiasm. At the classroom level, the incorporation of teaching practices that promote creativity can lead to positive changes in students' behaviours, social skills, self-esteem, and motivation and is strongly related to academic achievement (Runco, 2007). Thus, teaching creatively implementing creative approaches to develop lesson plan and engaging students with learning materials can lead to better learning outcomes viz-avis development of science and technology.

However, to the best of the researchers' knowledge, there has not been any strong report indicating teachers' knowledge or application of creativity in Biology classrooms in Nigeria. Biology teachers tend to prefer standardization over uniqueness thus promoting reproductions over understanding (Nwosu cited in Ibe, 2011). The possibility of the Nigerian child coping with the workforce of the 21st century, which requires manipulative skills, therefore, becomes questionable. There is an urgent need for implementing teaching practices that would boost skill acquisition and above all, academic achievement in biology among secondary school students in Nigeria. Biology teachers should essentially employ an art or a behaviour that depicts creativity in their classroom teaching for students' optimal academic achievement in biology.

Several research studies have reported that state of the art or behaviour of the teachers which depict teachers' creativity fostering behaviour (TCFB) in the classroom (Dickisi, 2013; Feldbusen & Treffinger, in Ozkal, 2014). Nine principles or components of TCFB demonstrating creativity fostering behaviours of teachers in the classroom situation (Crompton cited in Soh, 2015) have been found to include: Independence: encouraging students to learn independently; Integration: having a cooperative, socially, integrative style of teaching; Motivation: inspiring students to master factual knowledge so that they have a solid base for divergent thinking; Judgment: delaying judging students' ideas until they have been thoroughly worked out and clearly formulated; Flexibility: encouraging flexible thinking; Evaluation: promoting self evaluation in students; Questions: taking students suggestions and questions seriously; Opportunity: offering students opportunity to work with a wider variety of materials and under many different conditions or to even go beyond what they had learnt in the class; Frustration: helping students to learn to cope with frustrations and Failure: and show them that their ideas and concepts have value.

For nurturing and encouraging the creative potentials of teachers, fostering of external environment is to be considered. Studies have demonstrated that creativity is influenced to a large extent by the prevailing environment in the society and conditions in the school in which teachers are asked to operate (Okoli & Mbonu, 2014). Teachers' levels of creativity behaviour, therefore, depend on their attitude and working conditions in the school. Thus, teachers in a democratic environment who support the academic achievement in their students by being models of creative attitude, solving problems in an original fashion; communicate values which foster creative mindset are described as having high level of creativity fostering behaviour. On the other hand, teachers with practices that focus on notion acquisition and repetition are considered as those with low level of creativity fostering behaviours (Runco, 2007). The level of teacher creativity fostering behaviours would likely determine the achievement gains of their students.

The relationship between creative teaching and academic achievement has been examined by a number of investigators across different cultures, although the findings are inconclusive. While some researchers reported a significant achievement gains in the face of creative teaching (Saudat & Umaru 2015; Hosseinee 2008, and Chen 2012), others failed to arrive at such conclusion (Nori, 2002; Olatoye, Akintude & Yakassai, 2010). Other researchers have also found a relationship between creativity and academic achievement of male and female students (Hosseinee, 2008; Chen, 2012). There is, therefore, the need for further research in this area. Of more concern, however, is that despite the importance of biology in the development of science and technology, research has shown that in Nigeria, the academic achievements of students in the subject is low (Ekon, 2013; Okeke, 2007; Moris 2009; Okoro, 2018) and the consistency is revealed by the Senior School Certificate Examination (SSCE) results over time. This has generated great concern among educationists, psychologists and general public. Some of the major reasons for low academic achievements of students in biology that have consistently appeared in literature include: large class size, school timetabling, voluminous curriculum contents, students' learning styles and ineffective teaching methods used by teachers (Okeke, 2007). The researchers, however, argues that the inability of teachers to engage in creativity fostering teaching behaviour in Biology classrooms in Nigeria may account for students' poor achievement over time, hence the motivation for this study.

STATEMENT OF THE PROBLEM

Teaching and learning of Biology constitute a crucial factor in the improvement of lives of the individuals and attainment of science and technological development, especially in the areas of manufacturing and processing industries, medicine, food productions, and pharmaceuticals among others. In the light of these, academic achievement in Biology is expected to be on the increase following the importance of the subject in nation building. Nevertheless, previous studies have shown that students' academic achievement in Biology is persistently low, especially at the senior School Certificate Examination (SSCE). Persistent low and under achievement in science generally and Biology in particular is a threat to national development in the area science and technology in Nigeria. Reasons such as large class size, school timetabling, voluminous curriculum content and students' learning styles are apparent. Moreover, little or no empirical research document was available which examined creativity fostering behaviours of teachers as one of the major teaching strategies that could effectively enhance academic achievement of students in biology. In addition, only a few past research studies that investigated creativity levels of teachers could consider the impact on students with regard to gender. In view of this, the present study aimed to examine the impact of creativity fostering behaviours of biology teachers on male and female students' academic achievement in biology.

Research Questions

The following research questions were posed to guide the study.

- What are the levels of creativity fostering behaviours among Biology teachers?
- What are the mean achievement scores of students who are taught by biology teachers of different levels of creativity fostering behaviour?
- What are the mean achievement scores of male and female students who are taught by biology teachers of different levels of creativity fostering behaviour?

The three hypotheses formulated for the study include:

- There is no significant difference in the levels of creativity fostering behaviours among Biology teachers?
- There is no significant difference in the mean achievement scores of students who are taught by biology teachers of different levels of creativity fostering behaviour?
- There is no significant difference in the mean achievement scores of male and female students who are taught by biology teachers of different levels of creativity fostering behaviour?

METHOD

The study employed quasi experimental design because the subjects or students whose achievement in biology was being investigated were assigned to treatment or control condition (Ali, 2006). This design has been adopted by Adene et al (2021), Ejimonye et al. (2020a, b), Njoku et al. (2020), Offordile et al. (2021) in recent studies. Teacher creativity fostering behaviour levels served as conditions.

The study was conducted in Obollo A for Education Zone of Enugu state, Nigeria. ObolloA for education zone is geographically located in the northern part of Enugu state. It belongs to Enugu north senatorial zone and has three Local Government Areas: Igbo-Eze South, Igbo-Eze North and Udenu local government areas. The researchers' choice of the zone is based on consistent poor performance of students in Biology in the area.

The population of the study consisted of all the fifty seven (57) Senior Secondary One (SSI) Biology teachers and 5693 students (2254 males and 3439 females) in 42 co-educational public schools that have reached SS1 class in the zone for 2020 session using stratified and purposive random sampling techniques, two hundred and seventy (270) biology students (135 males and 135 females) from 10 public co-educational schools and twenty five (25) biology teachers (14 males and 11 females) were selected. The ten (10) schools were selected using simple random sampling. Three instruments that were used in this study include: Teacher creativity Fostering Behaviour Index (TCFBI), Biology Achievement Test (BAT) and Eysenck General Intelligence Test 4 (EGIT 4).

Teacher Creativity Fostering Behaviour Index (TCFBI) (Soh, 2000, in Dickici 2013) was used to measure teacher creativity fostering behaviour in Biology classrooms. TCFBI has nine principles for teacher creativity fostering behaviour which were operationalized in terms of teacher-student interaction. For each of the nine principles, there are three statements that depict teacher behaviour consistent with each principle. Examples of items in the scale include: Independence (Leave open-ended questions for students to find the answers by themselves), Integration (Allow students to share ideas/views), Motivation (Emphasize the importance of mastering the essential knowledge and skill), Judgment (Get the students to explore or experiment further before taking stand), Flexibility (Encourage students to ask questions even if they appear irrelevant), Evaluation (Allow students to share their strong and weak points with the class), Question (Listen patiently when students ask questions that may sound silly), Opportunities (Give students chance to complete an assignment/task/project in their own creative style) and Frustration (Encourage students who experience failures to find other possible solutions).

The TCFBI has been used and cited by many researchers who investigated different aspects of creativity development (Dickici, 2013). Any teacher that exhibits any of the creative behaviour receives a score of one and the total score represents the average scores for five weeks. The Teacher Creativity Fostering Behaviour index (TCFBI) was pilot tested using SSI biology teachers drawn from the non co-educational schools. A reliability analysis yielded a sufficiently

high Cronbach's Alpha coefficients for the subscales as follows: Independent 0.64, integration 0.67, motivation 0.77, Judgment 0.62, flexibility 0.69, evaluation 0.57, question 0.71, opportunity 0.64 and frustration 0.75 and 0.93 for the whole test.

The Biology achievement test was used to measure students' achievements in Biology. This is a 30 – item multiple choice objective tests, measuring achievement in the following content areas: Photosynthesis, Mineral requirement of plants, Food substances in animals, Enzymes, and Modes of nutrition in plants and animals. The test items were selected from West African Examination Council (WAEC) past questions and the content scope taught in the lesson. From the list of topics and expected behavioural outcome, the researchers prepared a table of specification from where the items for BAT were generated. The items were developed to cover lower and higher order levels of the cognitive domain as contained in Blooms (1956) Taxonomy of Educational objectivities. Thus, the 30 items were weighted according to knowledge, comprehension, application, analysis, synthesis, and evaluation.

The Biology Achievement Test (BAT) was trial tested to establish content and face validity using SSI biology students in the schools that were not part of the study. The instrument was given to three experts in educational psychology, education foundation, measurement and evaluation and Biology education, all from the Department of Science Education, University of Nigeria, Nsukka. The experts were requested to validate the items in terms of clarity of instructions to the respondents, suitability of items, accuracy of answers and content coverage, clarity of language and expression and appropriateness and adequacy of the items in measuring what they are supposed to measure. Through this procedure, the researcher eliminated, modified and selected the set of test items. To determine the reliability of the instrument, the data were analyzed using Kuder-Richardson 20 and a reliability coefficient of 0.77 was obtained. One mark was awarded to each correct answer.

EGIT-4 (Eysenck, 1981) was used to measure general intelligence. It is a 40-item objective type instrument that assesses components of intelligence like verbal, quantitative and spatial aptitude as well as logical reasoning, making inferences, creativity and problem solving. Using equivalent test, Ihekuna (1991) obtained a test-retest reliability coefficient of 0.66 for EGIT 4 and correlating EGIT 4 equivalent test with Cattell and Cattell's (1960) Culture Fair Test Scale 2, Ihekuna (1991) obtained a concurrent validity of 0.46 using Nigerian samples. EGIT-4 was used as a covariate to control for intelligence that may confound results. Research had shown evidence of a strong relationship between general intelligence and academic achievement. This trend has been widely reported for high school students (Jensen, 1998) and also among university students (Garcia, Lopez, Jcaran & Burgos, 2014). Correct option in each question is awarded 1 point.

EXPERIMENTAL PROCEDURE

The first stage was to categorize teachers on TCFB. The SSI Biology teachers were observed for creativity fostering behaviour during their biology classroom teaching in intact classes in each of the selected schools for two periods of 35 minutes each per week for five weeks. Each item in the Teacher Creativity Fostering Behaviour Index (TCFBI) was presented in a score sheet and the use of any of the nine components of creativity while teaching was scored 1 mark. The average scores in the TCFB for the period of the five weeks were collected using the score sheet and teachers were categorized in TCFB according to their scores as follows: 70-100% (High), 55-69% (Moderate) and 40-54% (Low).

Afterwards, 90 students (45 males and 45 females) were each assigned to the three levels of TCFB and the teachers in the different levels thought their students these selected topics: photosynthesis, mineral requirement of plants, food substances in animals, enzymes, and modes of nutrition in animals and plants at different lesson periods. These are the topics in SS1 syllabus that had not been taught in the selected schools at the time the study was conducted. The essence was to ensure that the students' prior knowledge of the topics in the SS1 biology would not influence their achievement in biology during the study. During the week following the completion of the teaching exercise, BAT was administered to the students in all the conditions (different creativity levels of biology teachers). The study adopted a quasi experimental design because students were each assigned to the three levels of TCFB.

RESULTS

Correlation analysis was conducted to ascertain whether scores on General Intelligence Test (EGIT4) and BAT would positively correlate and it was found that they are both significantly and positively related ($r = 0.57$), $p < 0.01$. This shows that general intelligence may influence performance in Biology. To compare whether students' academic achievement was as a result of the teacher creativity levels or due to the students' general intelligence, Analysis of Covariance (ANCOVA) was run using general intelligence as a covariate. Chi square analysis was also used to test the hypothesis relating to differences in the use of different levels of creativity fostering behaviour by biology teachers.

Research Question One

What are the levels of creativity fostering behaviour among Biology teachers?

Table 1: Table of Frequency and Percentage for Teacher Creativity Fostering behaviour (TCFB)

TCFB Levels Frequency Percentage (%)		
Above average (High)	4	16
Average (Moderate)	7	28
Below average (Low)	14	56

From Table 2 it is evident that majority of biology teachers 14 (56%) scored below average in creativity fostering behaviour. They were followed by teachers who had an average score of 7 (28%). The least number of teachers scored above average of 4 (16%) in creative fostering behaviour. Thus, majority of teachers 21 (84%) do not adopt creativity fostering behaviour when teaching biology.

Research Question Two

What are the mean achievement scores of students who are taught by biology teachers of different levels of creativity fostering behaviour?

Table 2: Mean Achievement and Standard Deviation Scores of Biology Students Taught based on Different Levels of TCFB.

TCreativity N Mean Std.dev			
High	90	20.12	3.41
Moderate	90	17.26	2.36
Low	90	15.90	2.53
Note: TCreativity = Teacher Creativity			

The results as presented in Table 2, indicate that students under high creativity teachers had a mean BAT score of 20.12 with a standard deviation of 3.41. Those students under moderate and low creativity teachers had mean BAT scores

of 17.26 and 15.90 and standard deviations of 2.36 and 2.53 respectively. From the mean scores, those students under high TCFB group performed better than those in other groups. The result suggests that teachers who exhibit high creativity fostering behaviour in teaching biology are more effective in enhancing learning achievement than moderate creativity teachers while low creativity teachers came out to be the least effective.

Research Question Three

What are the mean achievement scores of male and female students who are taught by biology teachers of different levels of creativity fostering behaviour?

Table 3: Mean Achievement and Standard Deviation Scores of Male and Female Biology Students based on Different TCFB Levels

TCreativity	StuGender	N	Mean	Std. dev
High	Male	62	19.63	15.53
	Female	28	20.61	3.33
Moderate	Male	55	17.49	2.29
	Female	34	17.03	2.47
Low	Male	73	16.26	2.51
	Female	17	15.53	2.58
Note: TCreativity = Teacher creativity; StuGender = Student gender				

Table 3 result indicates that under high TCFB levels, female students had a higher mean achievement score (Mean = 20.61 and Std.dev. = 3.33) than male students (Mean = 19.63 and Std.dev. = 3.44). However, under moderate TCFB level, male students achieved better than female students (Mean = 17.49 and Std.dev. = 2.29 for males and Mean = 17.03 and Std.dev. = 2.47 for females). Same with those under low TCFB (Mean = 16.26 and Std.dev. = 2.51 for males and Mean = 15.53 and Std.dev. = 2.58 for females).

Hypothesis One

There is no significant difference in creativity levels among biology teachers.

Table 4: Table of Chi Square Analysis

Levels of TSFB use	Observed N	Expected N	%	χ^2	df	Sig.
7.0	2	.030*				
High	4	8.0	16.67			
Moderate	6	8.0	33.33			
Low	14	8.0	58.33			

TCFB = Teacher creativity fostering behavior; * = $p < .05$.

From Table 4 it was discovered that 4 (16.67%) of biology teachers had high TCFB levels; 6 (33.335%) had moderate TCFB while 14 (58.33%) had low TCFB. This difference was significant at $\chi^2 = 7.0$, $df = 2$, $P < .05$ with majority of the biology teachers not fostering creativity among biology students.

Hypothesis Two

There is no significant difference in the mean achievement scores of students in Biology based on their teachers' levels of creativity fostering behaviour.

Table 5: Summary Table of Analysis of Covariance (ANCOVA) Showing Students' Overall Achievement Scores in Biology based on Different Teacher Creativity Levels

Source	Sum of Square	Df	Mean square	F	Sig.
Corrected model	790.22	3	263.41	35.11	.000
EGIT 4	106.32	1	106.32	14.17	.000
TCrea	562.43	2	281.21	37.48	.000
Error	1988.12	265	7.50		
Total	87930.00	269			
Corrected Total	2778.34	268			

Note: TCrea = Teacher Creativity

ANCOVA results as shown in Table 5 revealed a significant main effect of teacher creativity on BAT scores $F(1,265) = 37.48, p < .01$. The hypothesis of significant effect were accepted. Table of multiple comparison analysis conducted using Scheffe test is shown below.

Table 6: Post-Hoc Test of Ttudents' Academic Achievement in Biology based on Different Levels of Teacher Creativity Fostering Behaviour

					95% Confidence Interval for Difference	
TC(i)	TC(j)	MD(i-j)	Std. Error	Sig.	Lower Bound	Upper Bound
H	M	2.22	.42	.000	1.20	3.24
	L	3.56	.41	.000	2.57	4.56
M	H	-2.22	.42	.000	-3.24	-1.20
	L	1.35	.41	.004	.35	2.34
L	H	-3.56	.41	.000	-4.56	-2.57
	M	-1.35	.41	.004	-2.34	-3.5

Note: BAT = Biology Achievement Test; INT = Interest in teacher creativity; H = High TCL; M = moderate TCL; L =low TCL; MD = Mean difference.

The results in Table 6 show that students who were thought under high creativity level had significantly higher Biology achievement test (BAT) scores controlling for the effect of their intelligence test scores than students who were under moderate creativity level (Mean Difference (MD) = 2.22, $p < .01$) and also students who were under low creativity level (Mean Difference (MD) = 3.56, $p < .01$). Furthermore, students who were under moderate creativity level had significantly higher Biology achievement test scores controlling for the effect of their intelligence test scores than students who were under low creativity level (Mean Difference (MD) = 1.35, $p < .01$). Thus, those under low creativity level performed poorly more than other groups. From the mean differences as presented in Table 6, the participants in high and moderate group did significantly better than the low group. However, for low creativity level, the mean difference for high creativity level was far higher than that of moderate creativity level.

Hypothesis Three

There is no significant difference in the mean achievement scores of male and female students in Biology based on their teachers' creativity fostering behaviour level.

Table 7: Summary Table of ANCOVA Testing Difference in Mean Biology Achievement Test (BAT) Scores of Male and Female Students under Different TCFB Levels

Source	Sum of Square	Df	MS	F	Sig.
Corrected Model	235.09	2	117.54	12.29	.000
EGIT 4	231.35	1	231.35	24.20	.000
StuGender	7.30	1	7.30	.763	.383
Error	2543.26	266	9.46		
Total	87930.00	269			
Corrected Total	2778.34	268			

Note: StuGender = Student Gender

ANCOVA results as shown in Table 7 indicate a non significant effect of teacher creativity fostering behaviour on academic achievement of male and female students in Biology $F(1,265) = 37.48$, *ns*. Thus, hypothesis 2 was accepted.

DISCUSSIONS

The results as found in this study showed that majority of biology teachers do not employ teaching strategies that foster students' creativity in biology and teachers who elicited students' creativity through high creativity fostering teaching in biology turned out students that made substantial achievement gains. Although those who experienced moderate creativity fostering behaviour performed better than those in the low creativity levels, the mean difference in achievement is significantly higher for high creativity fostering teaching. The findings thus suggest that TCFB impacts positively on biology students' achievement. This conclusion is in line with extant findings. For example, it has been demonstrated that most teachers do not have creative skills, but practiced traditional teaching which did not promote academic achievement (Al-Najjar, 2012) and increased creativity traits of both male and female students subsequently enhanced their academic achievement in Biology (Saudat & Umaru, 2015; Shacter, Thum & Zikfin, 2006). The result of this study could count at least in part for the findings that creative teaching could promote greater mastery, retention and students' academic achievement.

Researchers have for long argued that it was crucial for teachers to think and be creative in order to develop creativity in their students (Summak & Aydin, 2011). This is because effective teaching strategies involve student-centered activities, a connection between teaching contents and real life arrangement of skills in class, open-ended questions, an encouragement of creative thinking and use of technology and multimedia (Hong, 2005). Creativity as an institutional and purposeful search for innovation in problem solving enable a student to interpret a problem differently and using his or her creativity (imaginative thoughts) to solve a problem from different perspectives (Okoli & Mbonu, 2014). Thus, when teachers make their lessons creative, the students become more engaged and motivated and are more likely to be on than off task (Bowkett, 2006). For example, compared to the control group, teachers who participated in creativity teaching program had significantly more diverse knowledge, developed a better attitude to teaching and acquired more skills (Hosseinee, 2008).

From the cognitive learning framework, creative instructions make the learner a problem solver self sufficient in discovering things for him or herself since the emergence of a solution to problems is illustrative of insight that results from integration with the mental process. Thus, science teachers who foster creativity among students create opportunities for students to think deeply and develop cognitively. Cropley cited in Dikici (2013) identified teacher creativity fostering behaviours as having a socially interactive and co-operative teaching style, encouraging students to learn freely and motivating students to have strong foundation and detailed knowledge in multifaceted learning. An essential part of

enhancing creativity in students, therefore, is teachers' knowledge of the concept, their attitude and behaviour towards students. The science teacher with an improved knowledge of creativity could generate a creative environment in which individual differences are appreciated. A creative environment in the science classrooms (teacher – behaviours, attitudes, strategies, and activities) could develop creative thinking in the students that manifests in higher achievement in science.

The result of this study found a non-significant gender difference in biology achievement under different TCFBs. Studies that have reported no significant gender difference including Ogundoyin and Olatoye (2007). Okoli and, Mbonu (2014) reported no difference in achievement of male and female students on general creativity test and on each component of creativity namely fluency, originality, flexibility and creativity motivation. Also, Duman, Gocen and Yakar (2014) and Naderi, Abdulla, Aizan, Sharir and Kumar (2010) failed to show any meaningful gender difference in achievement with regards to creativity fostering behaviour of teachers. Some possible explanations for these findings have been deduced. For example, Akanbi and Kolawole (2014) posit that differences in achievement of male and female students could be taken care of by using good methods, materials and appropriate teaching strategies. Also, in contemporary times, gender discrimination is fast closing up with parents tending to hold similar perception and expectations for their sons and daughters. This parent child relations, family support and encouragement given to both sexes appear to reduce the incidence of gender differences in many accomplishments, including biology achievement in the face of different creativity fostering behaviour.

CONCLUSIONS AND RECOMMENDATIONS

The results of the present study suggest that teacher creativity fostering behaviour can make differences in students' academic achievement in biology. Specifically, it was revealed that students who were taught by teachers with high and moderate levels of creativity fostering behaviour had better achievement than those teachers with low creativity levels. It could be correct to posit that teacher creativity fostering behaviour, though more challenging and activity packed strategy, makes learning in the science classroom fun and exciting. For example, students in the experimental group who were taught using creative approach were more interested and appreciated science subjects, had better attendance and increased participation in the laboratory activities than the control group (Travis, Brandi & King, 2008). The findings is supportive of the potential benefit of sponsoring pre-service and in-service workshops to enhance teachers' creative thinking ability and adoption of more effective and creativity engendering strategies in instructional delivery. The implication is that schools should provide teachers with encouragement and supportive institutional environment, promote teachers' creativity attitudes, innovative and imaginative behavior through positive reinforcement. This may create the needed support for teachers to cultivate positive work behaviour by actively seeking opportunities for improvement and change. It is, therefore, recommended that curriculum planners should include creativity education methods in teacher preparation programs. Further studies should increase sample size and test the findings outside the locale of this study. There is also the need to investigate the impact of TCFB on aspects of students' interest in biology.

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