Journal of Education, Society and Behavioural Science

31(4): 1-10, 2019; Article no.JESBS.51413
ISSN: 2456-981X
(Past name: British Journal of Education, Society & Behavioural Science, Past ISSN: 2278-0998)

Relationship between Creative Thinking and Students Academic Performance in English Language and Mathematics: The Moderating Role of Gender

Mahama, Inuusah[1*], Kwaw, Regine[1], Mensah, Kwame Jonathan[2], Acheampong, Ebenezer[3] and Marfo, Richard[4]

[1]Department of Education and Psychology, Faculty of Educational Foundations, College of Education Studies, University of Cape Coast, Ghana.
[2]Department of Education, Offinso College of Education, Offinso - Ashanti Region, Ghana.
[3]Department of African Collections, Sam Jonah Library, University of Cape Coast, Ghana.
[4]Department of Education, Agogo College of Education, Agogo - Ashanti Region, Ghana.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JESBS/2019/v31i430159
Editor(s):
(1) Dr. Nwachukwu Prince Ololube, Department of Educational Foundations and Management, Faculty of Education, University of Education, Port Harcourt, Nigeria.
Reviewers:
(1) Olutosin A. Otekunrin, Federal University of Agriculture, Nigeria.
(2) Alan Garfield, University of Dubuque, USA.
(3) Eduardo Mario Lacues Apud, Universidad Católica del Uruguay, Uruguay.
Complete Peer review History: http://www.sdiarticle3.com/review-history/51413

Original Research Article

Received 25 June 2019
Accepted 06 September 2019
Published 13 September 2019

ABSTRACT

Aims: This study sought to explore the moderating role of gender in the relationship between creative thinking and academic performance in English Language and Mathematics among Junior High School students in the Aboom Circuit, Cape Coast.
Study Design: The design for the study is correlational espousing the quantitative approach. The study was guided by two research hypotheses, which were tested using Pearson Product-Moment Correlation and Andrew F. Hayes Moderation Process. The instruments for the data collection were Kumar, Kemmler and Holman (1997) Creativity Styles Questionnaire-Revised (CSQ-R) and standardised-type test developed by experts in the various subject areas.

**Corresponding author: E-mail: inuusah.mahama@stu.ucc.edu.gh;*

Results: The study revealed significant relationship between creative thinking and academic performance of students (English Language: r=.432, n=140, p=0.05, p=.003, 2-tailed; Mathematics: r=.401, n=140 p=0.05, p=0.000, 2-talied). The study further revealed that gender moderated significantly in the relationship between creativity and academic performance (English Language: b=-.276, t=-2.398, CI= -.485, -.088; Mathematics: b=-.300, t=-2.198, CI= -.564, -.070). As such, male respondents had higher creative thinking effect in English Language and Mathematics than female respondents (b=.371, t=4.608, CI [.212, .530; b=.219, t=2.286, CI [.030, .407]).
Conclusion: Creative thinking indeed relates to performance, as such, it was recommended that creative thinking should be nurtured among all students in J.H.S. In addition, stakeholders in education should consider including creative thinking in the curriculum and pay special attention to nurturing creative think in female students so that they could match up with their male counterparts.

Keywords: Creative thinking; gender; students and academic performance.

1. INTRODUCTION

Being creative in life is indispensable as it is believed to be part and parcel of everyday activities of people [1]. Creativity is diverse, which includes such fields as business, manufacturing, technology, medicine, administration, education, even defense rather than confined to fine art, literature, performing arts, music, and similar artistic domains [1]. Reid and Petocz [2] mentioned that creativity is viewed in different ways in different disciplines. In education it is called “innovation”; in business “entrepreneurship”; in mathematics it is sometimes equated with “problem-solving”, and in music it is “performance”. According to Cropley [1], creativity results in tangible objects such as artworks, books or music, as well as buildings, machines, or devices, but go beyond these to encompass ideas, processes, services, or systems of operation, production and delivery. It encompasses doing these things in ways that are, on the one hand novel and on the other effective in achieving a desired result. The result may range from abstract actions such as communication of a feeling, arousal of esthetic admiration, provocation of a new way of looking at something, development of new understandings of experience or existence, to concrete results [1]. Creativity is an active process necessarily involved in innovation. It is a learning habit that requires skill as well as specific understanding of the contexts in which creativity is being applied. The creative process is at the heart of innovation and often the words are used interchangeably [3]. Creativity is the intellectual ability to reason differently and find unique answers to problems [4,5,6].

Cannatella [7] indicated that the need for creativity is naturally, tangibly, and mentally an indispensable part of human nature, and that, it is necessary for human-reproduction, growth and cultural striving. Clarkson [8] has stated that there are many qualities which have been associated with creativity, such as divergent thinking, introversion, self-esteem, tolerance for ambiguity, willingness to take risks, behavioural flexibility, emotional variability, ability to absorb imagery, and even the tendency to neurosis and psychosis. Literature on creativity seem to be scanty but then, it is believed that there may be several kinds of creativity [9]. For instance, MacKinnon [10] has outlined three different kinds of creativity used as a basis for research at the Institute of Personality Assessment and Re-search Laboratory (IPAR), Berkeley, California. The first is artistic creativity, which reflects the creator’s inner needs, perceptions and motivations. The second type is scientific and technological creativity, which deals with some problem of the environment and results in novel solutions but exhibits little of the inventor’s personality. The third type is hybrid creativity, found in such fields as architecture that exhibits both a novel problem solution and the personality of the creator.

According to Kampylis and Berki [3], creative thinking enables students to apply their imagination to generating ideas, questions and hypotheses, experimenting with alternatives and to evaluating their own and their peers’ ideas, final products and processes.

According to Tsai and Shirley [11], several theories and empirical studies such as those of Baer and Garrett [12]; Hennessey [13]; Piirto [14] have offered various perspectives that brighten creativity development. The major findings of those studies arrived at two conclusions about creativity: (a) everyone has creativity and (b) creativity can be taught and developed.

Therefore, teachers can be imperative resource in facilitating students learning experience and reveal their potential in the classroom. As a result, one of the key responsibilities of teachers is to inculcate the habit of creativity in students' minds. In education, creative problem solving serves as an important platform to promote creative thinking among students [15]. Chia-Yi and Seokhee [16] investigated the effects of creative problem solving ability among 409 Taiwanese fifth and sixth grades students in terms of mathematics and concluded that different thinking and domain specific knowledge could predict the mathematics problem-solving ability. Conversely, Nickerson [17] has recognized that how to improve creativity is not well implicit, but there are options that worth consideration. For instance, Mednick and Andrews [18] investigated the relationship between creativity and Intelligent Quotient by using the Remote Associates Test (RAT; [19] to measure creative thinking, and the Scholastic Aptitude Test (SAT) of verbal and mathematical ability (SAT-V & SAT-M) as the indicators of IQ. The results from scores of high school students and college freshman showed a moderate relationship between intelligence and creative thinking.

1.1 Relationship between Creative Thinking and Students' Academic Performance

In terms of creative thinking and academic performance, Ai (as cited in [20]) studied the relation between creativity and academic achievement. In the study, the students were randomly selected from 68 schools (2,264 students, 38% were boys and 62% were girls). Three creativity scales, the Torrance Test of Creative Thinking (TTCT), the Abedi-Schumacher Creativity Test (CT), and the Villa and Auzmendi Creativity Test (VAT), were used. The academic achievement of the students' was assessed using a self-reported achievement in four subject areas English, Science, Mathematics and Social Studies. A canonical correlation analysis found that when operationalized by their grades, creativity was related to academic achievement for both boys and girls. For girls, related to two of the academic subject areas (Social Studies and English) and fluencyrelated to natural science and mathematics. In a similar study conducted by Nami, Marsooli, and Ashouri [20] among 242 randomly sampled students, the study revealed a positive strong correlation between these two variables (creative thinking and students' academic performance). The researchers concluded they had 99 percent confidence that there is positive significance between creativity and academic achievement and higher levels of creativity for students increase their academic achievement. Ogunsanya, Akintunde and Olatoye [21] investigated the relationship between students' creativity and academic achievement using their CGPA scores among 235 students. The study found low negative significant relationship between Creativity and CGPA scores and found that higher the students creativity, the lower the CGPA scores. A creative person may not necessarily be a high achiever in the school. Muhammad, Naseer, Khizar, Aness, and Anwar [22] explored the relationship between creative thinking and academic achievements of the secondary school students using randomly selected 256 participants. The study revealed a significant relationship between Creative thinking and academic achievement and found a significant relationship between creative thinking and students' academic achievements on different aspects of test of creative thinking. In a study among 306 randomly selected students, it revealed that there was a weak but negative correlation between creativity thinking and academic performance of the students. The value of r = - .090 was indicated and it showed a negative correlation value. The researchers concluded that a creative person might not necessarily be a high achiever in education [23].

1.2 Gender Difference Relationship between Creative Thinking Academic Performances of Students

Research on academic success of students has provided no reliable and consistent indication concerning the extent of creativity, age and gender on academic achievement [24]. A search on academic achievement studies revealed that various variables had been identified as correlates of academic achievement. In spite of the biological differences, there has been a consensus that there are no significant sex differences in intelligence generally [25,26]. Even though there are no sex differences in general intelligence and divergent thinking ability, females remain significantly under-represented in creative fields related to design, science and technology. Females less often study physical sciences, engineering, computer studies and related fields at every level of education from elementary school to graduate school [27]. Helson [28] maintained that, the understanding of

creativity in women involves paying attention to the social world, individual differences in motivation and to changes in society over time. According to Jackson and Rushton [29], findings of "no sex difference in intelligence" have since been replicated many times on different standardization samples with different test batteries. Halpern [30] in a study indicated that males are frequently observed to obtain average higher scores on some tests of spatial ability, mathematical reasoning, and targeting, while females are often found to have average higher score on some tests of memory, verbal ability, and motor coordination within personal space. A study conducted among 28 students in the 4th grade of an elementary school in Bandung City was aimed to establish whether there are differences in creative thinking skill between male and female students. The result of this research indicated no difference in creative thinking skill between male and female students after the application of Team Games Tournament (TGT) learning [31]. The issue of gender differences in creative thinking is a complex and controversial one. Although gender differences in creativity have been assessed in several studies, the results have been inconsistent. For instance, researchers such as Jaquish and Ripple [32]; Agarwal and Kumari [33] found no statistically significant gender differences whereas others like Coone [34]; Tegano and Moran [35] among others found gender differences, at times favouring women and sometimes favouring men [36]. A study conducted among students concerning the role of gender in creative thinking and performance revealed that male students were high (M = 80.70) than female students M= 66.97). It means the male students were better in creative ideas than the female counterparts. It was concluded that there was a great impact of gender to the five components of creative thinking ability [37]. Similarly, Naderi, Abdullah, Aizan, Sharir, and Kumar [38] in their study concerning creativity, age, and gender predicting academic achievement revealed that creativity, age and gender predicted academic achievement but such predictions were low (R=.378, R -Square= .143) despite existence of significance relationship (F= 8.294, sig=000, P<0.01) among the variables.

Having explored numerous studies on creative thinking and academic performance, it is clear that such studies are geographically different from that of the study area. Again, it can be observed that in such studies respondents were varied and could not account for general conclusion that creative thinking relates to performance or otherwise. With respect to observed variable like gender moderating the relationship between creative thinking and academic performance, least is known as research works focused on other psychological variables different from those under investigation. For instance, studies such as Semordzi, Odame-Mensah, Hammond and Amoako [39], Zhang, Ren and Deng [40] and Ye, Posada, and Liu [41] used gender as moderator in relationship studies pairing personality traits against career choices and academic stress, gender difference in creativity and academic performance and academic self-efficacy. In terms of the Aboom Circuit located in the Cape Coast Metropolis, it is widely agreed that students' performance is usually appreciable for instance 50.21% of candidates who sat the BECE in 2015 passed their core subjects(English Language and Mathematics) (WAEC Chief Examiner's report as cited in [42]). In light of this, the researchers sought to ascertain if gender in anyway could moderate the relationship between creative thinking and academic performance of Junior High School students in the Aboom Circuit. Doing this will help improve instruction by providing course delivery strategies tailored differently for the promotion of creative thinking among male and female students. The purpose of the current study was to identify relationship between creative thinking and students' academic performance in English Language and Mathematics as they are moderated by gender. Specifically, the following hypotheses were tested:

1. **H0:** There will be no significant relationship between creative thinking and academic performance of students.

   H1: There will be a significant relationship between creative thinking and academic performance of students.

2. **H0:** Gender will not significantly moderate the relationship between creative thinking and academic performance of students.

   H1: Gender will significantly moderate the relationship between creative thinking and academic performance of students.

Comprehensive literature is available to accentuate the relationship between creativity and academic performance as indicated in the

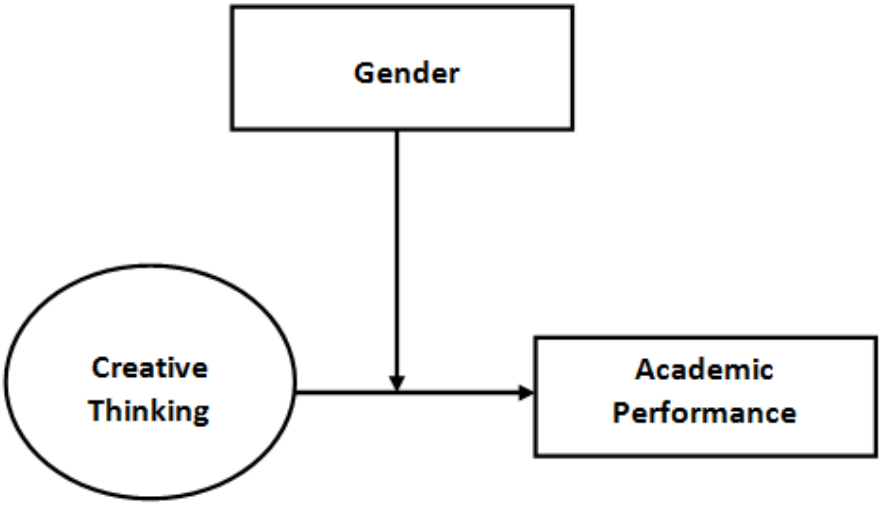

Fig. 1. Authors' construct

construct named Fig. 1. However, it is scarcely document the influencing role that socio-demographic variable like gender play in making the relationship possible or not. Therefore, the construct sought to find the moderating role of gender as a third variable concerning the relationship between creative thinking and academic performance of students.

2. RESEARCH METHODOLOGY

The study employed a non-experimental research design known as correlation design. The choice of the design was appropriate because the study investigated the relationship between variables and made no effort in manipulating variables as in causal-effect comparative studies. The population for the study was all Junior High School students in the selected schools within the Aboom Circuit, Cape Coast, with population estimate of 1345. It is this attribute that makes participants eligible as population members. The accessible population was all Junior High School Three (3) students with population estimate of 523 (365 males and 158 females). The J.H.S. Three (3) students were used for the study because they are those believed to have covered greater part of the syllabi used in constructing the performance instrument. The sample size was 140 (81 males and 59 females) based on 25 percent of the accessible population as proposed by Nwana [43]. Multistage sampling procedures (Random sampling, stratified sampling and systematic sampling) were used in selecting participants for the study. Random sampling procedure was used to select four (4) out of ten (10) junior high schools in the Aboom Circuit. Stratified sampling procedure was used to apportion samples to the various schools as it gave a fair representation of the population of the sampled schools. Lastly, systematic sampling procedure was used to select individual respondents from the sampled schools using a kth term of 4 as a decision number. Table 1 presents information about the sample for the selected schools.

The instruments for the data collection were adapted standardised Scale developed by Kumar, Kemmler and Holman [44] Creativity Styles Questionnaire-Revised (CSQ-R) with a reliability coefficient of .74. The reliability

Table 1. Sample of junior high school 3 students from the circuits

Schools	Proportion	Sample	J.H.S 3 Boys	J.H.S 3 Girls
St Nicholas J.H.S.	38.0	53	30	23
Antem M/A J.H.S.	19.0	27	17	10
Aboom Methodist J.H.S	24.0	33	18	15
Aboom Zion J.H.S.	19.0	27	16	11
Total	**100.0**	**140**	**81**	**59**

Source: Field Data (2019)

Coefficient for the tests were English Language (.74), Mathematics (.77), with a composite coefficient of .76, which lies within the normal range [45]. The test items were 40 each for a subject and were considered standardized because they were developed, reviewed and validated by a team of experts in the various subject areas. The activity time for the test was 30 minutes each for a subject. The data collected were analysed using inferential statistical tools such as Pearson Product-Moment Correlation and Andrews F. Hayes Processing.

3. RESULTS AND DISCUSSION

In all, 140 questionnaires with equal number of test papers were administered to the students. There was a return rate of 100%. The resounding return rate occurred because of the fact that students were on the verge of writing their final examination in school and as such, all were always available for guidance from their teachers towards the examinations. No member of the research team involved in lobbying for all to be present at the period of data collection but it occurred naturally. The views of the respondents are presented in the sections that follow:

3.1 Gender Distribution of the Respondents

Table 2 presents that both male and female students participated in the study. It was indicative that male students were more than female students as the male participants had a frequency of 81 representing 57.8% while the female respondents were 59, representing 42.2%.

3.2 H1: There will be a Significant Relationship between Creative Thinking and Academic Performance of Students

Table 3a offers the relationship between creative thinking and academic performance of students in terms of English Language. The results from the analysis revealed that creative thinking among students correlate positively with their performance. The correlation between the creative thinking and academic performance was moderate and the p-value shows a statistically significant relationship. This is evident after the two variables produced a results of (r=.432, n=140, p=0.05, p=.003, 2-tailed) which is less than p value of 0.05. This brings to the understanding that when students think creatively, they are likely to perform well academically. The findings corroborate that of Muhammad, Naseer, Khizar, Aness, and Anwar [22] study findings, which revealed a significant relationship between creative thinking and academic achievement and found a significant relationship between creative thinking and students' academic achievements on different subjects.

Table 2. Gender distribution of the respondents

Gender/Sex	Frequency	Percentage
Male	81	57.8
Female	59	42.2
Total	**140**	**100**

Source: Field Data (2019)

The results in Table 3b revealed that there was a statistically significant moderate positive relationship between social curiosity and academic performance of students'. This manifested after the Pearson Product Moment correlation coefficient produce a result of (r=.401, n=140 p=0.05, p=0.000, 2-talied) implying that students creative thinking could have significant influence on the academic performance. The findings debunked results of a put out by Mishra and Garg [23] which showed a weak but negative correlation between creative thinking and academic performance of the students and as such, a creative person might not necessarily be a high achiever in education.

Table 3a. Relationship between creative thinking and academic performance in English language

Variable		Creative thinking	English performance
Creative Thinking	Pearson Correlation	1	.432**
	Sig. (2-tailed)		.003
	N	140	140
English Performance	Pearson Correlation	.432**	1
	Sig. (2-tailed)	.003	
	N	140	140

*Source: Field Data (2019); **Correlation is significant at the 0.05 level*

Table 3b. Relationship between creative thinking and academic performance in Mathematics

Variables		Creative thinking	Mathematics performance
Creative Thinking	Pearson Correlation	1	.401**
	Sig. (2-tailed)		.000
	N	140	140
Mathematics Performance	Pearson Correlation	.401**	1
	Sig. (2-tailed)	.000	
	N	140	140

*Source: Field Data (2019); **Correlation is significant at the 0.05 level*

3.3 H2: Gender Will Significantly Moderate the Relationship between Creative Thinking and Academic Performance of Students

A moderation analysis was conducted to explore the role gender in mediating the relationship between creative thinking and students' academic performance. The predictor was creative thinking, the moderator was gender and the criterion was academic performance. However, the criterion was multifaceted in nature such that the composite of it could not be used. The academic performance comprised English Language and Mathematics. The moderation was done using 5,000 bootstrap samples. This bootstrap figure was used to the fact that the sample was not all that huge and as well, contained more than two distributions from the population. The use would allow for building not only on population parameters but estimation for confidence intervals of p-values.

The result in Table 4a showed that gender moderated significantly in the relationship between creative thinking and English Language Performance, b=-.276, t=-2.398, CI (-.485, -.088). Further analysis revealed that the effect of

English Language as Y

Table 4a. Gender moderating the relationship between creative thinking and English Language performance

Variables	Coeff	BootSE	t-value	BootLLCI	BootULCI
Constant	-7.772	3.925	-1.804	-15.715	-.262
Creative Thinking (CT)	.647	.076	7.868	.503	.799
Gender (G)	9.918	4.925	1.721	.848	20.119
CT*G	-.276	.103	-2.398	-.485	-.088
Conditional effects of the focal predictor at values of the moderator(s):					
Male	.371	.081	4.608	.212	.530
Female	.095	.181	.526	-.262	.452

*Model summary: R^2=.442; F (3, 152) =40.211, p<.001; CT*ELP: R^2 change=.021; F (1, 152) =5.749, p=.018*
Criterion: English Language Performance

Mathematics as Y

Table 4b. Moderating role of gender in the relationship between creative thinking and mathematics performance

Variables	Coeff	BootSE	t-value	BootLLCI	BootULCI
Constant	-2.187	4.880	-.427	-12.308	7.030
Creative Thinking (CT)	.519	.092	5.315	.348	.710
Gender (G)	7.474	6.252	1.092	-4.096	20.539
CT*G	-.300	.126	-2.198	-.564	-.070
Conditional effects of the focal predictor at values of the moderator(s):					
Male	.219	.096	2.286	.030	.407
Female	-.082	.215	-.381	-.506	.342

*Model summary: R^2=.378; F(3, 152)=30.772, p<.001; CT*G: R^2 change=.020; F(1, 152)=4.829, p=.029*
Criterion: Mathematics Performance

creative thinking on English Performance was high for male respondents, b=.371, t=4.608, CI(.212, .530) than female respondents. The findings support that of Piaw (37) which revealed that male students were high than female students in terms of male students been better in creative ideas than the female counterparts.

The result in Table 4b shows that gender significantly moderated the relationship between creative thinking and mathematics performance, b=-.300, t=-2.198, CI (-.564, -.070). Further analysis revealed that the effect of creative thinking on mathematics performance was high for male respondents, b=.219, t=2.286, CI (.030, .407) than female respondents. The revelation debunked that of Naderi, Abdullah, Aizan, Sharir, and Kumar (38) as gender predicted positively but low on academic achievement among students.

4. CONCLUSION AND RECOMMENDA-TIONS

It is concluded that creative thinking in no small way has a reflection in performance concerning scholastic work. The study revealed significant relationship between creative thinking and students' performance in English Language and Mathematics. Again, gender of students significantly moderated the relationship between creative thinking and academic performance. As such, teachers must make time to plant the seed of creativity in their students so that they can learn and achieve through their guidance. Again, it is important that stakeholders work out modalities in adding creative thinking to the curriculum at the basic level in order to put students in shape before they get to high school.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Cropley AJ. Definitions of creativity. Encyclopedia of creativity. San Diego, CA: Academic Press; 2011.
2. Reid A, Petocz P. Learning domains and the process of creativity. The Australian Educational Researcher. 2004;31(2).
3. Kampylis P, Berki E. Nurturing creative thinking. International Academy of Education, UNESCO; 2014.
4. Harris LVA. Idea engineering: Creative thinking and innovation. New York: Momentum Press; 2014.
5. Saccardi M. Creativity and children's literature: New ways to encourage divergent thinking. California: ABC-CLIO; 2014.
6. Wang SC, Peck KL, Chern JY. Difference in time influencing creativity performance between design and management majors. International Journal Technology Des Education. 2010;20:77-93.
7. Cannatella H. Embedding creativity in teaching and learning. Journal of Aesthetic Education. 2004;38(4).
8. Clarkson A. Educating the creative imagination: A course design and its consequences. Jung: The e-Journal of the Jungian Society for Scholarly Studies; 2005.
   Available:http://www.thejungiansociety.org/Jung%20Society/e-journal/Volume-1/Clakson-2005.html
9. Gomez JG. What do we know about creativity? The Journal of Effective Teaching. 2007;7(1):31-43.
10. MacKinnon DW. IPAR's contributions to the conceptualization and study of creativity. Chicago, IL: Aldine Publishing Company; 2005.
11. Tsai KC, Shirley M. Exploratory examination of relationships between learning styles and creative thinking in math students. International Journal of Academic Research in Business and Social Sciences. 2013;3(8):506-519.
12. Baer J, Garrett T. Teaching for creativity in an era of content standards and accountability. New York, NY: Cambridge University Press; 2010.
13. Hennessey BA. Intrinsic motivation and creativity in the classroom: Have we come full circle? New York, NY: Cambridge University Press; 2010.
14. Piirto J. The five core attitudes, seven I's, and general concepts of the creative process. New York, NY: Cambridge University Press; 2010.
15. Sak U, Maker C. Developmental variation in children's creative mathematical thinking as a function of schooling, age, and knowledge. Creativity Research Journal. 2006;18(3):279-291.

16. Chia-Yi L, Seokhee C. Predicting creative problem solving in math from a dynamic system model of creative problem solving ability. Creativity Research Journal. 2011; 23(3):255261.
17. Nickerson RS. Enhancing creativity. New York, NY: Cambridge University Press; 1999.
18. Mednick MT, Andrews FM. Creative thinking and level of intelligence. The Journal of Creative Behaviour. 1967;1(4): 428-431.
19. Mednick SA. The associative basis of the creative process. Psychological Review. 1962;69(3):220-232.
20. Nami Y, Marsooli H, Ashouri M. The relationship between creativity and academic achievement. Procedia - Social and Behavioural Sciences. 2014;114:36-39.
21. Ogunsanya EA, Akintunde SO, Olatoye RA. Relationship between creativity and academic achievement of business administration students in South Western Polytechnics, Nigeria. African Research Review. 2010;4(3):134-149.
22. Muhammad G, Naseer M, Khizar A, Aness M, Anwar NM. Relationship of creative thinking with the academic achievements of secondary school students. International Interdisciplinary Journal of Education. 2012;1(3):44-47.
23. Mishra M, Garg K. A correlation study of creativity traits and academic performance of higher education students. International Journal of Science Technology and Management. 2015;4(11):452-462.
24. Komarraju M, Karau SJ, Schmeck RR. Role of the big five personality traits in predicting college students' academic motivation and achievement. Learning and Individual Differences, In Press, Corrected Proof; 2008.
25. Lippa RA. Gender, nature and nurture. Mahwah, NJ: Lawrence Erlbaum; 2002.
26. Anderson M. Sex differences in general intelligence. Oxford, UK: Oxford University Press; 2004.
27. Robertson HJ. The idea book: A resource for improving the participation and success of female students in math, science and technology. Ottowa: Canadian Teachers' Federation; 1988.
28. Helson R. Creativity in women: Inner and outer views over time. Newbury Park: Sage; 1990.
29. Jackson DN, Rushton JP. Males have greater g: Sex differences in general mental ability from 17 to 18-year-olds on the Scholastic Assessment Test. Intelligence. 2006;34:479-486.
30. Halpern DF. Sex differences in cognitive abilities. Mahwah, NJ: Lawrence Erlbaum Associates; 2000.
31. Alpaugh PK, Birren JE. Variables affecting creative contributions across the adult life span. Human Development. 1977;20:240-248.
32. Jaquish GA, Ripple RE. Cognitive creative abilities and self-esteem across the adult life span. Human Development. 1981;24: 110-119.
33. Agarwal S, Kumari S. A correlational study of risk-taking and creativity with special reference to sex differences. Indian Educational Review. 1982;17:104-110.
34. Coone G. A cross-cultural study of sex differences in the development of selected creative thinking abilities. Doctoral dissertation, University of Georgia, Dissertation Abstracts International; 1969.
35. Tegano DW, Moran JD. Sex differences in the original thinking of preschool and elementary school children. Creativity Research Journal. 1989;2:102-110.
36. Ruth JE, Birren JE. Creativity in adulthood and old age: Relations to intelligence, sex, and mode of testing. International Journal of Behavioral Development. 1985;8:99-109.
37. Piaw CY. Effects of gender and thinking style on students' creative thinking Ability. Procedia - Social and Behavioral Sciences, 2014;116:5135-5139.
38. Naderi H, Abdullah R, Aizan HT, Sharir J, Kumar V. Creativity, age and gender as predictors of academic achievement among undergraduate students. Journal of American Science. 2009;5(5):101-112.
39. Semordzi DK, Odame-Mensah S, Hammond NK, Amoako I. Moderating role of gender in the relationship between personality trait and career choice among university students. American Journal of Humanities and Social Sciences Research (AJHSSR). 2019;3(6):198-202.
40. Zhang W, Ren P, Deng L. Gender differences in the creativity-academic achievement relationship: A study from China. The Journal of Creative Behaviour. 2018;1-8.
DOI: 10.1002/jocb.387

41. Ye L, Posada A, Liu Y. The moderating effects of gender on the relationship between academic stress and academic self-efficacy. International Journal of Stress Management. Advance online publication. 2017;1-7.
Available:http://dx.doi.org/10.1037/str0000089
42. Quansah AE. Factors contributing to the academic achievement of Junior High School students in the Aboom Circuit, Cape Coast, Ghana. Unpublished Mphil Thesis, University of Cape Coast; 2017.
43. Nwana OC. Introduction to educational research. Ibadan: Heinemann Educational Books (PLC); 1992.
44. Kumar VK, Kemmler D, Holman ER. The creativity styles questionnaire-Revised. Creativity Research Journal. 1997;10(1): 51-58.
45. Ritter NL. Understanding a widely misunderstood statistic: Cronbach's Alpha. Paper presented at the annual meeting of Southwest Educational Research Association, New Orleans, USA; 2017.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle3.com/review-history/51413