

## Evaluation of Creative Thinking Skills amongst Students in Kenya: A Case Study of Public Secondary Schools in Nyeri and Nairobi Counties

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### Abstract

*Creative thinking skills are vital competencies in the life of every individual. Therefore, people with creative thinking skills are able to innovate and come up with novel solutions to problems that confront them in life. In this way, they become innovators and problem solvers. Creative thinking is competences that enable learners to apply their imagination in generating ideas, hypotheses, and experiment with alternatives to generate new products and processes. The purpose of this study was to evaluate the creative thinking skills among students in boys', girls' and co-education public secondary schools (PSC) in Nyeri and Nairobi Counties. The study adopted the descriptive survey research design guided by the social cognitive theory as its theoretical framework. The target population consisted of 69,220 learners in 300 PSC in Nairobi and Nyeri Counties. The schools in the two counties were stratified into boys, girls and mixed-sex schools. Therefore, 4 boys', 5 girls' and 21 co-education secondary schools were selected to form a sample of ten percent of the schools from each stratum. Data was collected using a questionnaire administered to the sampled students. A total of 391 respondents were sampled in both counties. Analyzed data indicated that the students in Nairobi County had moderately higher creative thinking skills than their fellow students from Nyeri. The computed mean score for students' creative thinking skills per county were; Nairobi ( $\bar{x} = 3.06$ ) and Nyeri with ( $\bar{x} = 3.03$ ). Independent Sample t-test of creative thinking skills of learners in both gave a p-value 0.584 which was above 0.05 significance level, this indicated that there was no significant difference in creative thinking among students in Nairobi and Nyeri Counties. Additionally, the study sought to find out the creative thinking skills among learners in single sex and co-education public secondary schools in the two counties. Data analysis revealed that girls schools posted the highest level of creative thinking abilities ( $\bar{x} = 3.08$ ), followed by boys schools ( $\bar{x} = 3.07$ ) while mixed-sex secondary schools had a mean score of 3.01. The computed ANOVA for boys, girls and mixed-sex secondary schools, yielded a p values of 0.478 which was above 0.05 significance level, indicating that there was no significant difference in creative thinking skills among students in single sex and co-education secondary schools at 95% limit. Therefore the null hypothesis was accepted and concluded that the creative thinking abilities among students in the three categories of schools were relatively the same. The study concluded that there is need to strengthen creative thinking skills among learners in the three school categories in both counties in Kenya.*

**Keywords:** Creative thinking, skills, innovative ways, problem-solving, competence, public secondary schools

## INTRODUCTION

Creative thinking is increasingly gaining prominence as a preferred competence in the 21st century, this has largely been informed by novel demands in the labour market as the structures of the world economy becomes more and more innovative-oriented (Florida, 2004). The Jomtien world education conference held in Thailand underscored the significance of an educational curriculum that is relevant to the changing needs of the populace. In particular, it was observed that learners at all levels and all parts of the world need to be equipped with appropriate life skills in order to function competently in information-based economies (UNESCO, 2012). This implies that the workers of the 21<sup>st</sup> century must be endowed with abilities that empower them to suggest, formulate and implement novel ideas in innovative ways in order to effectively address new challenges in the world that were non-existent and undefined in the traditional, industrial and social setting. In this regard, the rejoinder lies in promotion of creative thinking abilities as an indispensable dimension of instruction in schools and all institutions of learning. In response to this, policy makers in education have scoured to align educational goals and curricula in approaches that are believed to promote integration of creative thinking as an instructional and educational goal (OECD, 2016). According to Cash (2011), realization of creative thinking skills amongst students in schools is critical for graduates at whatever level of learning if they are to play a functional role in the 21st century economy labour force. In agreement with this view, Beghetto and Kaufman (2010) stressed the centrality of creative thinking as an indispensable competence in finding solutions to the myriad problems facing mankind around the world. Creative thinking is the bedrock for industrialization, good governance and improved standards of living (Cash, 2011). In this regard, it is obligatory that schools provide a curriculum that stimulates learners to think creatively as they interact with educational content, peers, society, physical environment, among others, right from an early age so as to develop innovative ways of addressing difficulties prompted by alterations in the digital revolution.

Vulliamy (2010) observes that implications prompted by the rapid upsurge in information, technology and changes in social structures have underpinned the need for continuous modification of pedagogy at all levels in order to maintain relevance of curriculum offered in institutions of learning. The world economies are becoming increasingly competitive and interlinked; this has steered to complex concerns that mandate innovative problem solvers and creative thinkers to guard the interests of their citizenry. Pink (2005) argues that, creative thinking is considered an essential criterion for attainment in a vastly multidimensional and mutually dependent world. In agreement to this view, Githui, Njoka and Mwenje (2017) contend that low level of creative thinking abilities among learners in secondary schools raise fundamental concerns regarding the relevance of the future work force in Kenya, against the premise that creative thinking is critical in development of new technologies and innovations deemed important in ensuring food security and industrial take off. Arguing in the same vein, Kampylis and Berki (2014) assert that creative thinking enables persons to mobilize their intellectual resourcefulness to generate broad-minded philosophies by interrogating societal problems. Brooks-Young (2010) contend that creative thinking incorporates curriculum content matter and practical skills that enable individuals to contribute successfully to the world and society. Fadel, (2008) reports that in USA, the Partnership for 21st Century Skills forum highlights the importance of learner acquisition of mastery in skills such as, decision making, creative thinking, problem solving, critical thinking and conflict resolution. According to Chua (2010) the government of Malaysia modified the school curriculum to place a lot of importance on

creative thinking and innovation as an advantage towards improvement of a work force furnished with appropriate competencies in line with the demands of the 21st century. Creative thinking is taught alongside the core academic subjects such as sciences, arts, mathematics and languages and as an integral component of the curriculum.

According to MoEST (2008) and de Bono (2008), there is need to prepare learners to make informed choices, think critically, solve problems, build healthy interpersonal relationships and succeed in life; these aspects of cognition can be acquired through instruction, mentorship and practice. Dzulkifli (2010) also affirms that creative thinking can be learned from training and practice. However, Mellou (1996) asserts that the best way to nurture creative thinking skills among learners is through modification of the social and psychological environment with a view of providing learners with opportunities to observe other people act creatively and to recreate. A study by Lee (2005) revealed that the level of creative thinking among high schools learners differed with the location of the school; these differences were explained by variation of features in the social environment as well as demographic variables such as age and gender. In agreement to this view, Csikszentmihalyi (2005) stressed on the importance of the learners social environment as a determinant of creative thinking abilities, noting that the social environment can influence or impede learners' development based on the inspiration of models in their lives. Remarkably Stephens, Karnes, and Whorton (2001) add that children living in metropolitan neighbourhoods are exposed to several role models and have opportunities to demonstrate and experiment compared to their counterparts in the countryside. The consequence of this is that youths brought up in urban areas have demonstrated higher levels of creative thinking as compared to rural youth.

Apollo Research Institute (2012) documented the significance for skills gained through auxiliary components of instruction, spotting that schools were not geared to produce graduates for the 21<sup>st</sup> century workforce, not because they were incapable but due to competing demand by stakeholders in education. This perhaps serves to exemplify the education environment in Kenya. Secondary schools are under pressure from stakeholders across the board to produce learners with high test scores as opposed to practical problem-solvers. There is also the overwhelming emphasis for learners to pass national examinations and secure the limited positions in public universities. This overemphasis on theoretical education relegates important life skills such as creative and critical thinking in the background and predisposes learners to compete for limited openings in the job market. Paradoxically, such an education system only serves to create job seekers in formal employment as opposed to "creators" of employment. Undoubtedly, learners are prepared to enter the existing workforce upon completion of schooling with little innovative entitlement in their credentials. A gap in innovation is apparent in relation to skills of thinking creatively, particularly in terms of self-employment. Based on the gravity of this delicate situation, special consideration should be paid in determining how best to address the systemic weaknesses within our curriculum with a view to secure the future of our country. This paper explored gender and rural/urban variations in creative thinking skills of students in public secondary schools (PSC) in Kenya.

The paramount importance of the need to equip learners with creative thinking skills as a critical life skill required in stimulating innovations, technological advancement and improvement in the socio-economic wellbeing of the contemporary competitive society cannot be overemphasized. Throughout the ages, educational institutions have endeavored to produce individuals with creative thinking capabilities manifested in problem-solving and

development of innovations deemed instrumental in solving societal problems. Creative thinking is one of the most sought educational outcomes in the 21st century as a response to the demand for innovations and technological advancement in addressing challenges of the global economy (Florida, 2004). The world conference on education for all (EFA) in Jomtien, Thailand and the international community underscored the importance of world nations to develop a relevant education that focuses on equipping learners with appropriate life skills (UNESCO, 2012). The demand for a work force endowed with creative thinking abilities has led educational policy makers around the world to align their educational goals and curricula in ways that foster development of creative thinking abilities among learners in schools. This study sought to assess level of creative thinking abilities among learners in secondary schools from Nyeri and Nairobi counties in Kenya.

## RESEARCH METHODOLOGY

A descriptive research design was used to evaluate the creative thinking abilities of students admitted in government sponsored secondary schools in Kenya. Study population was students learning in Nairobi and Nyeri Counties. Nairobi County had 86 Public Secondary School (PSC) with students' population of 58,424 whereas Nyeri County had 214 PSC with students' enrollment of 10,796 (MoEST, 2013; Nyeri County Education Office, 2013). The schools were stratified into three groupings; namely, boys only, girls only schools and mixed-sex secondary schools. According to Kothari (2011) in a descriptive study a sample of 10% of the population is sufficiently dependable for a large population. Consequently, 10% of the schools from each school category was randomly selected to give a sample distribution as follows, Nairobi County, two boys', two girls and four mixed-sex schools, while in Nyeri two boys, three girls and seventeen mixed-sex secondary schools. The total number of secondary schools that were sampled for the study was 30. Sample size was determined by a formula developed by Kathuri and Pals (1993). Nairobi and Nyeri Counties had a form three PSC students population of eighteen thousand, three hundred and five. Therefore, the sample size used was 391 respondents who were equitably distributed in the 30 sampled schools. Table 1 presents a summary of the sample size.

**Table 1: Sample Size**

County	Total No. of schools			Schools Sampled			Students Sampled	
	Boys	Girls	Mixed	Boys	Girls	Mixed	Boys	Girls
Nairobi	20	24	42	2	2	4	52	52
Nyeri	19	25	170	2	3	17	137	150
Total	39	59	212	4	5	21	189	202

Data was collected by use of questionnaires administered to the sampled students. Questionnaires were considered appropriate due to the large number of respondents involved and because the students could competently respond to the items in the instrument. The questionnaire gathered data on the respondents' creative thinking abilities and consisted of 10 items on a likert scale, ranging from strongly agree, agree, not

sure, disagree and strongly disagree. This instrument was adopted with modifications from the Psychosocial Competence Scale developed by Dindigal and Aminabhavi (2007). The responses obtained were used to rate the level of the respondents creative thinking abilities by computing a mean score on a scale of 1-5. The mean scores were categorized into low, moderate and high. The minimum score was 1 and the maximum was 5. The respondents who scored below 3.0 were believed to have a low level of the creative thinking, 3.0 – 3.9 designated moderate levels while scores of 4.0 and above reflected high level of creative thinking skills. The data analysis was further conducted to compute, percentages, frequencies, means and standard deviations for descriptive and inferential analysis. The questionnaire was piloted in two schools using a random sample of 26 students and a reliability coefficient of 0.801 of the instrument was obtained using Cronbach's coefficient alpha. According to Fraenkel and Wallen (2003) in descriptive studies, a reliability coefficient of 0.70 and above is considered appropriate for the internal consistency of the items. The data was analyzed with the help of a computer software Statistical Package Social Sciences version 20.

## RESULTS AND DISCUSSIONS

### Students Creative Thinking Skills according to Counties

In assessing creative thinking skills among learners in public secondary schools (PSC) in Nairobi and Nyeri Counties, the sampled respondents indicated their opinions on a questionnaire with ten items in a five point likert scale. The responses were used to compute a mean score ( $\bar{x}$ ) of creative thinking ability for the respondents on a scale of 1 to 5. Table 2 provides a summary of the findings.

**Table 2: Mean Students Creative Thinking Skills according to Counties and School Categories**

County	Boys	Girls	Combined(Boys and Girls)
Nyeri	3.05	2.96	3.03
Nairobi	3.10	3.03	3.06

Analyzed data presented in Table 2 provides a summary of creative thinking skills of learners in PSC in both counties. As shown in the table, boys' in Nairobi County posted the highest level of critical thinking with a mean score ( $\bar{x} = 3.10$ ) and girls had a mean score ( $\bar{x} = 3.03$ ). In Nyeri County, boys again recorded a higher creative thinking mean score of ( $\bar{x} = 3.05$ ) while girls a mean score of ( $\bar{x} = 2.96$ ). The mean score computed for learners' creative thinking skills according to county were; ( $\bar{x} = 3.06$ ) and ( $\bar{x} = 3.03$ ) for Nairobi and Nyeri Counties respectively. These results indicated that students in Nairobi County were gifted better with creative thinking abilities than their fellow students in Nyeri County, furthermore, boys in both counties performed better than girls. These findings concur with a study by Orasanu and Connolly (1993) which established that, contextual, chronological, gender factors and environmental elements influenced adolescents' creative thinking abilities. The study also agrees with Csikszentmihalyi (2005) who observed that the social atmosphere in which individuals are brought up influence the development of their creative thinking skills. Adolescents in towns and cities were reported to exhibit higher levels of creative thinking paralleled to their colleagues from the countryside (Stephens, Karnes, & Whorton, 2001). As highlighted by Mellou (1996), creative thinking among learners in

different school locations is different due to features such as school neighbourhood, community factors, age and gender. Dzukifli (2010) agrees with that view and adds that creativity can be enhanced through practice and modeling. Consequently, in this study the observed differences in creative thinking among urban and rural adolescents could probably be explained by differences in exposure to creative thinking environments in the urban and rural upbringing.

It had been assumed that there was no statistically significant difference in creative thinking skills among students in PSC in both counties. To test this hypothesis, independent sample t-test was computed for the mean scores of the two counties. The findings are presented in Table 3.

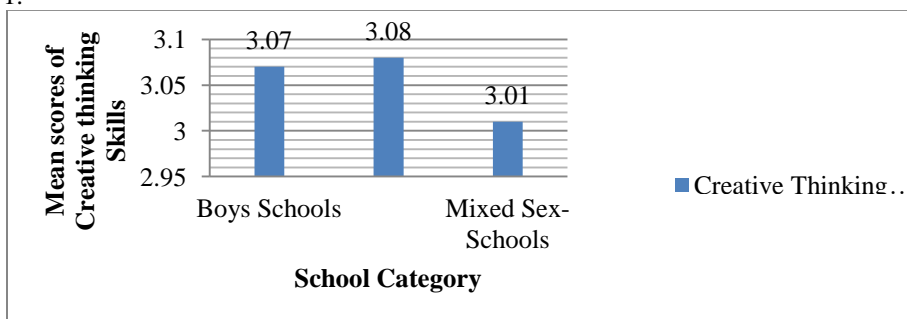
**Table 3: Independent Sample t-test of Creative Thinking Skills of Learners in Nyeri and Nairobi Counties**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Creative thinking	Equal variances assumed	.064	.801	-.548	411	.584	-.03218	.05876	-.14768	.08332
	Equal variances not assumed			-.562	182.978	.575	-.03218	.05722	-.14508	.08072

Data analysis presented in Table 3 revealed that t-test calculated yielded a p-value 0.584 against the  $\alpha$ -value of 0.05. Therefore, the null hypothesis was accepted and it was concluded that the creative thinking abilities of learners in the two counties were largely the same. These finding complements Billig (2002) study which revealed that creative thinking abilities among urban youth were higher compared to rural youth. Urban youths viewed social or community problems as systemic rather than personal, become more innovative oriented in their search for solutions, created more alternatives, and proceeded with more rational solutions. Consequently, gender differences as well as the cosmopolitan environment of Nairobi compared with the rural environment of Nyeri could be among the variables that contributed to differences in creative thinking skills of the students in this study.

**Creative Thinking Skills of Learners according to School Category**

This study also tried to investigate creative thinking skills among students in boys', girls' and co-education PSC in Nyeri and Nairobi Counties. The findings are presented in Figure 1.



**Figure 1: Creative Thinking Skills of Learners according to School Category**

Data analysis provided in Figure 1 reveals that girls schools posted the highest level of creative thinking abilities ( $\bar{x}= 3.08$ ) this was followed by boys schools ( $\bar{x}=3.07$ ) and mixed-sex secondary schools came last with a mean score of 3.01. These findings are in agreement with Csikszentmihalyi (2005) who observed that the society in which learners grow up in has an impression on development of their creative thinking abilities. Therefore, it is plausible that girls' secondary schools provide an environment that better nurtures growth of creative thinking abilities more than boys' secondary schools. Earlier studies by Stone and Neale (1984), Billig (2002) and Gilligan (1982) established statistically significant differences between boys and girls in terms of their creative skills. The studies proposed that boys usually were more problem-solving oriented and used more novel approaches to solve their problems compared to girls. This was attributed to different socialization patterns into different gender roles, with more emphasis being placed on independence for boys and decorum and mannerism for girls (Gilligan, 1982; Stone & Neale, 1984). This study conclusively indicates that school category was among the dynamics that influenced the creative thinking abilities among students.

It had been assumed that there was no statistically significant difference in creative thinking skills among learners in boys, girls and co-educational (mixed sex) PSC in both counties. To test this hypothesis one way Analysis of Variance (ANOVA) was computed. The findings are provided in Table 4.

**Table 4: ANOVA of Creative Thinking of Learners in Single Sex and Mixed-Sex Schools**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.395	2	.197	.740	.478
Within Groups	109.060	409	.267		
Total	109.454	411			

According to ANOVA results above, the p values of single sex and mixed-sex schools was 0.478 which was above 0.05 significance level, indicating that there was no significance difference in the creative thinking skills of students between single sex and co-education secondary schools at 95% confidence limit. This indicates that the creative thinking skills among learners in the three school categories was relatively alike. These findings are at variance with a study by Bender, Nibbelink, Towner-Thyrum, Vredenburg (2013) which established significant differences between males and females, with superior creative abilities in females. Remarkably, earlier studies by Seng (1991), Maccoby and Jacklin (1974) on learner's creative thinking abilities reported significant gender differences, however, other studies such as Potur and Barkul (2009) reported otherwise. Chua, Roth and Lemoine (2014) underscored cultural influence in acquisition of creative thinking skills and authoritatively stated that male and female have divergent world views on the basis of their upbringing and thus received different responses. The contribution of gender roles in creative thinking has been explored to establish not only if females and males contrast in terms of their creative abilities, but also identify the aspects that contribute to the probable differences.

## CONCLUSIONS

The study established that creative thinking skills were higher among students in PSC in Nairobi County compared to students in Nyeri County. Analyzed data indicated that there were no statistically significant differences in students' creative thinking abilities in both counties. Also there was no statistically significant difference in the creative thinking abilities of students from single sex and co-education (mixed sex) secondary schools. Data analysis revealed that girls' secondary schools posted the highest level of creative thinking abilities, this was followed by boys' schools and mixed-sex secondary schools came last. The test of the hypothesis using ANOVA indicated that there was no statistically significant difference in the creative thinking skills of students from single sex and co-education secondary schools. It was concluded that the creative thinking skills among students in the three school categories was relatively the same.

## RECOMMENDATIONS

The findings from this study have several implications for practice by secondary school teachers, parents and all stakeholders in the education sector in addressing creative thinking skills among learners. It was recommended that there was need to address the relative low levels of creative thinking skills for students in Nyeri County. The study further recommends the need to carry out a study in order to establish the causes of low levels of creative thinking among learners in co-educational (mixed sex) secondary schools.

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