INFLUENCE OF STUDENTS SELF-CONCEPT ON ACADEMIC PERFORMANCE OF SECONDARY SCHOOL STUDENTS IN MATHEMATICS IN MERU SOUTH SUB-COUNTY, KENYA

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ABSTRACT
Mathematics is the backbone for prosperity in almost all fields of Life. Secondary school mathematics education lays a strong foundation for all types of learning at the secondary school level and more so at higher levels of learning. Thus, mathematics is a prerequisite for better achievement at higher stages. Developing individuals with strong self-concept does contribute significantly to their performance. Studies on self-concept and their impacts on academic performance have predominantly focused on teachers specific instructional methods. Students believe that knowing mathematics is about remembering and applying certain rules correctly in a problem and that the only correct answer is the one given by the teacher. Most research into factors that influence academic performance mainly focus on cognitive domains but less on affective domains of learning. Students' self-concept has been linked to academic achievement, social adjustment, healthy behaviour and positive employment outcomes. Thus, there is comparatively little self-concepts research examining influence of aspects - concept construct (academic effort, family background, students' perception and number of contact hours of the teacher) on academic performance. The researcher used a quantitative approach using correlational design. All the aspect of self-concept were hypothesized to influence academic performance. This design allows the understanding of important phenomena through the identification of relationship among variables. Simple random sampling was used to draw Coeducational schools. The study population was all Form two students in Meru South Sub-County. The sample size was 277 Form two students in Meru South Sub-County, Kenya. The instrument for data collection was self-descriptive questionnaire. Students completed self-concepts scales. Students' scores in mathematics at the end of term were collected. The marks were analyzed to establish whether there was a trend between high self-concept and higher academic performance. Quantitative data collected was analyzed using mean, standard deviation, a one-way ANOVA with the help of Statistical Package of Social Scientists (SPSS) version 25.0. Cronbach alpha was used to test reliability of the research instrument. The reliability was 0.84. The study revealed a strong relationship between students' aspects of self-concept and academic performance. On students' effort and students' family background, girls had higher variability on interest in learning, self-concept is perceived positively by students; however this does not affect directly students' mathematical performance but does so when students put less efforts in solving problems on what has been taught to them previously. The researcher recommends that teachers and all stakeholders should take it as their responsibility to develop students' positive self-concept when interacting with them.
Keywords: Self-concept, Student perception, Family background, Contact hours, Student effort.

INTRODUCTION

The Kenya strives to achieve Vision 2030 and the Government's big four agenda with an objective of providing globally competitive quality education and training for development. The purpose is to reduce illiteracy, increase access, realize 100% progression and transition in all levels of education as well as raise the quality and relevance education with emphasis on science, technology and innovation. In chapter four of the Kenya Constitution (2010), obligates both the state and parents to facilitate quality basic education for all students. The Kenya Constitution (2010) provides free and compulsory basic education to all children since education is recognized as a human right. The Kenya Government has put measures, both legislative and in policy framework to ensure that the basic education is available to all and is free to all (Basic Education Act, 2013). An example is through the Ministry of Education in corroboration with Kenya National Examination Council (KNEC), which ensures quality curriculum delivery and administration of National exams that are free from cheating. Over the recent years, many candidates have performed poorly (KNEC, 2018). Mathematics is one of the subjects that performance has been below D+ over the last three years (KNEC, 2016, 2017 and 2018) examination reports. When students ask questions, the problems they have might be unclear. This causes errors in basic mathematics procedures. Mathematics subject become like a Puzzle, which makes the learning environment with less interest. Students become bashful and shy from asking questions and they think they have no ability in mathematics. They lose their self-confidence. The poor performance in mathematics has been

attributed to several factors, which include teachers' professional teaching experience, teaching approaches, teaching and learning resources and the abstract nature of mathematics (Githua, 2013). There is inadequate research conducted in Kenya on the influence of students' aspects of self-concept on academic performance in Mathematics.

Self-concept is conceptualization of how a student views his/her academic ability relative to other students (Cooley, 2000 as cited in Ekow, 2014). According to Cooley (2000), academically successful individuals are identified with domain of academics. Academics must be part of their self-concept more specifically they must have a positive academic self-concept. Three different aspects of self-concepts include: self-image, or how one sees himself or herself. It is a mixture of attributes such as physical characteristic, personality traits, and social roles. An individual is likely to develop negative self-esteem when they compare themselves to lacking something, and positive self-esteem when they respond positively. Thus the way you see yourself and how you would like to see yourself do not match up.

Chetri (2014) views self-concept as those perceptions, beliefs, feelings, attitudes and values an individual perceives about his or her abilities and his status in the outer world. According to Chetri (2014), an individual with good self- concept tend to more accepting than of others. Building student cognitive and affective self-concept has positive influence on academic performance of the students. Our self-concept is not always aligned with reality. Some students believe they are great academician but their results reports otherwise (congruence). From childhood, parents have placed conditions on their affection for their children through certain behaviour. The formation of self-esteem is influenced by the family dynamics. Family is the first social group where interactions determine who children are. Every parent should take it as the responsibility of making sure there is affection, security and attention. Parents should supply vital encouragement and drive which will make their children to walk through this world feeling that they are valuable people.

Research conducted on 98 first year engineering students at city university of New York by Gerardi (2009) found that academic self-concept was the best predictor of academic success. The findings of the study showed students perceived self-concept positively. Similarly, Crawford (2013) found out that students self – concept influence their academic performance; however, the level of effort exerted by the student in learning largely contributes significantly to students' self-concept in boosting their academic performance. Development of students' self-concept need consideration as this will be consequential to the entire process of helping build around the importance of the self in human personality and personal adjustment. These studies focused on University students and the present study examined secondary school students who have not excelled academically.

Arefi *et al.* (2014), in a study on the relationship between self- concept and academic achievement on Iranian high school students reported that there is a mutually reinforcing relationship between academic self-concept, attachment of students with the parents and academic achievement. Understanding family background of the learner is crucial for successful learning. Improving students' self- concept especially for low achievers has significance importance. Marsh and Craven (2006), found out that self-concept and achievement are reciprocally related sharing the domain causal relationship. Most research work have either put more emphasis on competence or combined competence with affect aspect (Jansen et al., 2014).

Hoge, Smit and Crist (2012) also conducted a two-year longitudinal study of 322 sixth and seventh graders that compared the three levels of self-concept (high, middle and low) and studied the influences of self-concept on achievement. The findings were that achievement on self-concept had influences of self-concept on grades were weak but grades had a modest influence on subsequent discipline-specific self-concept. The researchers concluded that past correlation studies have overstated the influence of self-concept on grades and of grades on self-concept. Self-concept has been found to be positively correlated with academic performance, but it appears to be a consequence rather than a cause of high achievement (Baumeister *et al.*, 2012).

A study was conducted on relationship between self-concept and academic achievement in Saudi girls aged 8 – 10 with learning disabilities. It was a descriptive study where Tennessee self-concept scale with six domains (physical, moral, personal, family, social and academic) were measured. Academic achievement was measured by considering the final marks in academic year. The results revealed that academic self-concept is affected by learning disability but not general self-concept. Similar results were found by Al Zyoudi (2010). Steinke (2010) noted that pupils who possess a good self-concept are actively involved in school, which leads them to be more successful. When students possess weak or negative self-appraisal they are likely to view themselves as incapable of success. Our perception of ourselves does not develop spontaneously but develop overtime due to interactions with others

and environment (Steinke, 2010). Teachers should strive to improve students' self-perception. The present study will focus on students in inclusive classroom.

Ju, Zhang and Katsiyannis (2013) conducted a study to investigate the reciprocal causal relationship between academic achievement and academic self-concept domains (self- image, social, and academic). Johnson III test and students concept scale. Parents' involvement was measured in terms of school and home involvement. It was found that parents' involvement was very important predictor factor of academic achievement and self-concept. A longitudinal Study by Dalun, *et al.,* (2011) on the level of parents engagement in school and home settings with elementary students with special needs and the relationship of this engagement to students achievement. They found parents' involvement at home is positively linked to higher educational performance. The reviewed literature strongly supports the proposition that there was statistically significant relationship between various construct of self-concept and academic achievement and those learners who have a positive self-concept do improve significantly (Schutte *et al.,* 2017). According to Williams and William (2010), students' beliefs influence students' performance on choice of activity, amount of effort, level of perseverance and the type of learning strategies. Students' beliefs on themselves do influence their academic behaviour, academic choices, educational aspirations and academic performance.

In Kenya, performance among students at the KCSE mathematics examinations has been poor for many years (Githua, 2013). Declining trend in mathematics has raised many concerns among parents, educational providers and other educational stakeholders in light of heavy investment placed in the education sector by the Kenyan government. In response to low performance in national examinations, Kinyua (2014) identified poverty and unskilled employment of parents as obstacles to academic performance of Girls and boys in Naivasha Sub-County.

Similar research by Sang (2016) in Kericho County on the influence of self-esteem on academic performance revealed that mothers employ their feelings when handling children's resulting to creation of a suitable work environment at home to do their schoolwork. In specific Counties such as Tharaka- Nithi, the situation is not different. The mean scores over a period of three years have been below 5.00 as shown in Table 1. Despite the effort by Ministry of Education introducing programmes such as Strengthening of Mathematics and Sciences in Secondary Education (SMASSE) and institution organizing extra classes for students and extra tuition at homes for day scholar's, performance is still below average. Table 1 shows performance for the last three years in KCSE examination.

Table 1: Candidate overall performance in mathematics in Meru South SubCounty

Year	Enroll	M/S	M/G
2016	4364	2.821	D
2017	2653	2.996	D
2018	3244	3.134	D

Source: Adopted from Sub County Director of Education (Annual Report 2017, 2018).

Student self -concept could be enhanced by constant feedbacks and interaction in classes by providing basis for reinforcement, verification and reinforcement of learnt ideas. One of the most important factor responsible for student academic performance is influenced by constructs of self- concept (Ekow, 2019). Incidentally, most of the research work has focused on relationships among the constructs of self- concept from western cultural background, which may be slightly different from Kenyan situation.

Statement of the Problem

Students, Parents, and teachers are putting a lot of effort in ensuring secondary school students in Kenya do perform well in their final Kenya Certificate of Secondary Education (KCSE). One of these attempts incudes; acts of organizing extra remedial classes for the weak students by teachers, parents spending extra monies on children education, and Government increasing teachers' salaries in order to motivate teachers to give off their best.

Notwithstanding these, it still appears most students continue to perform below average in Secondary schools in Kenya Certificate of Secondary Education. Most research into self- concept and relationship on academic achievement has focused on cognitive domains but less on affective domains. Thus, the present study seeks to fill the gap created in previous research by examining the influence of self-concept on academic performance of Students in Meru South.

Purpose of the Study

The purpose of this study was to investigate the influence of students' self-concept on academic performance in mathematics in secondary schools of Meru South Sub-County, Kenya.

Objective of the Study

1. To find out to what extent do students effort as an aspect of self-concept relate to their academic performance in mathematics.

2. To establish the influence of family background as an aspect of self-concept relate to students' performance in mathematics.

3. To determine influence of student perception as an aspect of self-concept do relate to their scores mathematical test.

4. To establish the relationship between students contact hours as an aspect of self-concept and their performance in mathematics.

METHODOLOGY

Research Design

A correlational research design using survey method was adopted for this study. This design allows collecting data to test the relationship between the set of variables. The study design also allows clarification and understanding of important phenomena through identification of relationship among variables without any manipulation (Gall *et al.,* 1996; Orodho, 2000). It involved random sampling of the Form two students in which the participants filled a questionnaire centered on the constructs of self-concept. The responses were correlated against mathematics scores at the end of term mathematics test.

Population and Sampling

Accessible population was all Form 2 students in Secondary Schools in Meru South Sub-County. The target population comprised of all Form 2 students in coeducational secondary schools in Meru South Sub-County in Kenya. Form 2 was selected because it was considered to have stayed in school for a longer period and that Form 4 are examination classes. The unit of sampling was schools and not participants. There are 37 coeducational secondary schools in Meru South Sub-County. Simple random sampling was used to select 10 schools.

A total number 450 both boys and girls was targeted in the 10 coeducational secondary schools. However, only 277 students participated in the study from these secondary schools. The instrument for data collection was self-description 18 item questionnaires adopted from Beatton and Frijters (2012). In this study, the selected dimension of self-concept was: students effort, students perception, family background and contact hours by the teacher. The aspects of self-concepts were treated as independent variables, while academic performance as dependent variable.

Instrumentation

The present study adopted self-description questionnaire to measure the level of self-concept of the participant. The questionnaire consisted of 18 items that are self-rated on a 5-point Likert scale 1 – 5 with responses ranging from Strongly agree (SA), agree (A), undecided (U) disagree (D) and strongly disagree (SD). Five represents the strongest agreements to the issues while one represents the least agreements to the issues. All items in the questionnaire obtained exclusively background information about the subjects. Question one included gender while question two focused on average score performance in end of term examination.

The subsequent sections considered students personal effort, family background, perception and contact hours self-concept. Question four comprised of nine items (a, e) were on students effort; (b, f) on family issues; (c, g) students perception and (d e, h) were on contact hours with the teacher. With regard to the academic performance of students, the students' average scores for the end of term one exam 2019 was used. The scores were put in five-point scale to match with that of the self-concept scale and in order to have uniformity regarding the measurements of the items. This makes it easier for inferential analysis. The questionnaire was pre-tested at secondary school with similar characteristic as that sample outside the sub county. The questionnaire was tested for internal consistency using Cronbach's alpha with a reliability coefficient of 0.84. This according to Malhotra and Birks (2007) is high and satisfactory.

Data Analysis

The data was collected from an accessible population through questionnaire. Both descriptive and inferential statistics was used to analyze data. Descriptive statistics was used to show how items related with various dimensions of self-concept were analyzed by ANOVA and Linear regression. It was screened, coded and keyed for analysis with help of statistical package of social sciences version 25.0. Mathematics scores were used to match with that of the self-concept scale in order to have uniformity regarding the measurements of the items. 5 (0-20), 4 (21–34), 3 (35–51), 2 (53-65), 1 (66 and above). Multiple regression analysis was used to determine whether self -concepts constructs variables predicted academic performance.

RESULTS AND DISCUSSION

Data collected was analyzed using frequencies, mean and standard deviation of responses falling in each of the 5-point Likert scale. The conclusion made in this study is based on the responses of a majority of students to the Likert scaled items [strongly disagree (SD); disagree (D); strongly agree (SA); undecided (U) and agree (A)]. The results of students' responses in questionnaire are shown in Table 2. The findings show that the performance of the most student was below average (2.16) rated as 2. Student effort (SA); family (SD), Student perception (A); number of contact hours (A). Further analysis was conducted to compare frequencies, means and standard deviation of each aspect of self-concept construct. Objective one sought to find out the extent to which students' effort as an aspect of self-concept relate to their academic performance in mathematics.

Table 2: The mean and standard deviation of the responses in students' questionnaire

Item response	Mean	Standard deviation	N
Performance	2.16	0.890	276
Students effort	1.67	0.970	271
Family background	2.16	1.335	257
Student perception	2.47	1.228	249
Number of contact hours	2.31	1.195	270

Table 3: Results on items sought information on student's effort in learning mathematics

Item response	Frequency	Percentage	Mean	Standard deviation
5	145	52.7	2.29	0.816
4	101	36.5	2.12	0.952
3	1	4.0	2.0	0.00
2	14	5.1	1.79	0.893
1	9	3.2	1.11	0.333
Total	270	97.8	1.67	0.97

This illustrates that 52.7% of respondents strongly agree and 36.5% agree that student personal effort influence performance in mathematics. The mean of 1.67 falls in the range of strongly disagreement that implies that student effort does not influence academic performance. These results are inconsistent with Crawford (2013) who found that the level of effort exerted by the student in learning is likely to result to development of self-concept leading to higher academic achievement. Higher levels of intrusive self-concept, higher student productivity, greater student engagement in problem solving and through consultation from peers' and teachers, and an improved sense of self-competences enhance students' self-concept. To test whether there was significant difference in the means, one way ANOVA was carried out and the results are presented in Table 4. The results shows $F(4,265) = 4.859$, $P < 0.05$, shows the level of students effort contribute to academic performance. To establish the relationship between students' mathematical performance and students effort linear regression analysis was conducted. The results of relationship between the variable are in Table 5.

Table 4: Analysis of variance for the self-construct of effort

Performance * Students Effort		Sum of squares	df	Mean square	F	Sig.
Between Groups	(Combined)	14.497	4	3.624	4.859	0.001
	Linearity	13.182	1	13.182	17.674	0.000
	Deviation from Linearity	1.315	3	0.438	.588	0.624
Within Groups		197.655	265	0.746		
Total		212.152	269			

Table 5. Measures of association

	R	R-squared	Eta	Eta squared
performance * effort	-0.249	0.062	0.261	0.068

Table 5 shows that R square = 0.062. This shows that 6.2% of performance is influenced by students' effort in academic and 93.8% is influenced by other factors outside this model.

Objective two sought to establish the influence of family background as an aspect of self-concept relate to students' performance in mathematics. The results are shown in Table 6. The items sought information on family background such as conflicts and education level of the parents. The three items each was used to elicit data on these self-concept which were later pooled together to form each of the sub self-concept for descriptive analysis. However, the items were measured on five-point Likert scale type as indicated earlier. The results in Table 6 shows that 51.3% of respondents are in agreement that self-concept aspect of family influences academic performance while 29.6% of the respondents disagree that self-concept aspect of family does not influence academic performance. A mean of 2.09 was obtained which falls on respondents that were undecided.

The results show how family aspect of self-construct influence performance of mathematics but further analysis of variance was carried out to find whether the differences of means were statistically significant. The results are shown in Table 7. F (4, 252) = 1.863; P> 0.05; this shows the there is no statistically significance difference in the performance of students as influenced by family background. Table 8 presents the association between the variables.

Table 6: Results on items sought information on student's family background

Item response	Frequency	Percentage	Mean	Standard dev
5	37	13.4	2.05	0.664
4	105	37.9	2.33	1.025
3	34	12.3	2.09	0.755
2	42	15.2	2.07	0.835
1	39	14.4	1.95	0.793
Total	257		2.16	1.335

Table 7: Analysis of variance of family aspect of self-concept

			Sum of squares	df	Mean square	F	Sig.
performance * family	Between Groups	(Combined)	5.815	4	1.454	1.863	0.117
		Linearity	2.139	1	2.139	2.741	0.099
		Deviation from linearity	3.677	3	1.226	1.571	0.197
	Within Groups		196.644	252	.780		
	Total		202.459	256			

Table 8: Measures of association

	R	R-squared	Eta	Eta squared
performance * family	-0.103	0.011	0.169	0.029

The R Squared = 0.11 means only 1.11% of students' performance is influenced by self-concept aspect of family and 98.99% is influenced by other factors. The Study findings of Chiu and Klassen (2010) conflicts with these findings since they found out for students from a culture, which tolerates more uncertainty, do influence mathematics achievement.

The results also conflict with studies carried out by on Hong Kong parents that Excellent examination results are considered representative of the status and good reputation of the family (Lau *et al.*, 2004), According to Tabone (2011), self-appraisal is created through interactions with one's environment and the influence of others. How students identify with the community, political movement or religion many not necessary reflect their performance.

Objective three sought to establish influence of student perception as an aspect of self-concept do relate to their scores mathematical test. The results are indicated in Table 9.

Table 9: Results on item on perception of students

Item response	Frequency	Percentage	Mean	Standard deviation
5	50	18.1	1.46	0.579
4	110	39.7	2.12	0.825
3	39	14.1	1.85	0.779
2	22	7.9	2.91	0.294
1	28	10.1	3.0	0.903
Total	249	89.9	2.48	1.23

Table 10: ANOVA results of students' perception aspect of self-construct

			SS	df	MS	F	Sig.
performance* perception	Between Groups	(Combined)	60.074	4	15.019	26.685	0.000
		Linearity	46.465	1	46.465	82.558	0.000
		Deviation from Linearity	13.609	3	4.536	8.060	0.000
	Within Groups		136.765	243	0.563		
	Total		196.839	247			

Table 11: Measures of association

	R	R Squared	Eta	Eta Squared
Performance * perception	0.486	0.236	0.552	0.305

The results portray 57.8% of respondents agree that student's perception do influence academic performance while 19% are in disagreement that student's perception not contribute to academic performance. To find out whether there was statically significance difference in means ANOVA was carried out and the results are in Table 10 while that of association of variables is in Table 11. F (4, 243) = 26.685; P< 0.05. This means that students' perception aspect of self- concept construct was statistically significant. The results of Table 11 shows R squared = 0.236. This means that students' perception, aspect of self-concept are able to predict or explain only 23.6 % of the variance in students' academic performance in the school. It therefore means that besides this self-concept constructs identified, other factors not yet in the model have a chance of contributing or predicting about 76.4% to students' performance in math.

The fourth objective was to establish the relationship between students contact hours as an aspect of self-concept and their performance in mathematics. The results of respondents are presented in Table 12. The percentage of students in agreement 63.5 % while 16.3 % did disagreed that increasing contact hours influences ones performance. Analysis of Variance was conducted and the results are presented in Table 13 while the results of association of variables are indicated in Table 14.

Table 12: Students' responses on the number of contact hours

Item response	Frequency	Percentage	Mean	Standard deviation
5	76	27.4	2.39	1.047
4	100	36.1	2.12	.700
3	49	17.7	1.71	.707
2	24	8.7	2.63	.711
1	20	7.6	1.85	.933
Total	269	97.5	2.33	.873

Table 13: ANOVA of number of contact hours aspect of self-concept

				Sum of Squares	df	Mean Square	F	Sig.
performance hours	*	Between Groups	(Combined)	21.159	4	5.290	7.636	.000
			Linearity	3.261	1	3.261	4.707	.031
			Deviation from Linearity	17.898	3	5.966	8.612	.000
		Within Groups		182.893	264	.693		
		Total		204.052	268			

F (4, 264) = 7.636; P < 0.05

Table 14: Measures of association

	R	R Squared	Eta	Eta Squared
Performance * hours	-0.126	0.016	0.322	0.104

In the model, contact hour is a measure that represents an hour of scheduled instruction given to students. The selected contact hour's aspect of self-concept responses of students were entered as independent variables with students' academic performance in the school operating as dependent variable. The results as shown in Table 13 indicate that the way students see themselves significantly influences how they act in differently in various aspects of their learning. For instance, the number of contact hours aspect of self-concept was statistically significant, F(4, 264); $P<0.05$; however, R Squared was 0.016. This means that contact hours aspect of self-concept are able to predict or explain only 1.6% of the variance in students' academic performance in the school.

The findings are consistent with findings of Crede and Nathan (2008) which shown that study time, ability and attitude inventories were factor to be related with standardized tests and previous grades as parameters of academic performance. It therefore means that besides these aspects of self- concept constructs identified, other factors not yet in the model have a chance of contributing or predicting about 98.4% to students' academic performance in the school. The result suggests that there are variety of elements that academic performance depends on, a contact hour alone do not contribute significantly to their academic performance in the school and that they do so when other variables are considered.

CONCLUSION

The findings show there is strong relationship between students' students effort as an aspect of self-concept. Students' beliefs about their own abilities and about the relation between ability and effort influence the like hood that they will exert effort. Some student's beliefs and motivation is possible when students have success in a particular activity. Student's perception of himself or herself indeed influence performance significantly. Students' expectancy value is influenced by their beliefs and practices, and number of contact hours on performance in mathematics. The more hours the teacher exposes to the students the more likely they are to be in performance.

There was statistically insignificant difference in the level of performance in mathematics due to students' family background. Highly educated parents actively encourage their children to develop higher expectations of their own; such students perform better in school if their parents as well as mothers are actively involved in their education. The home environment provides environment for learning and is an element of and the basics for students' life that can affect academic performance. Providing opportunities to learn outside the school helps to facilitate student's success in the school environment. To enhance Students self-concepts, monitoring academic programmes is fundamental in ensuring students efforts is not influenced by various aspects of self-concept, which may affect their performance.

RECOMMENDATIONS

Science educators on how science students can achieve better in science and mathematics have carried out several educational researches. The researcher recommends the following:

(i) The government and those in educational affairs should encourage teachers who teach mathematics by providing them with materials or items that enhance students' self-concept and put more attention on student self-concept.

(ii) Educators are encouraged to incorporate students' perception, values, and beliefs when delivering new mathematical knowledge.

(iii) Educators should encourage students to put a lot of effort to understand and to be actively involved in problem solving in class lessons and in group activities. Creation of extra time of carrying out mathematics problems need to be put into consideration.

(iv) Similar research on other parts of the country for the purpose of generalization of findings, such study will help solve cultural and geographical differences.

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