

Influence of students' self perception on biology achievement among secondary school students in Nakuru county, Kenya

Nyambura Rose

Department of Curriculum and Educational Management

Laikipia University, Kenya.

Abstract

Acquisition of biology knowledge and skills at Kenya's secondary school is measured by administration of tests especially at national level. Achievement in biology has not been satisfactory in Kenya Certificate of Secondary Education examination (KCSE) and scholars have fronted various reasons that contribute to this unsatisfactory achievement. The factors include students' negative attitude towards the subject, lack of teaching/learning resources and inadequate staffing. Researchers have also investigated students' entry behavior which varies from individual to individual and so do learning outcomes. Irrespective of entry behavior, when meaningful learning takes place, the expectation is improved academic achievement. However this is not always the case and this study aimed at assessing the impact of students' self perception on achievement in biology. This study was guided by self perception theory (SPT) and adopted ex-post facto research design. Random sampling was used to select a sample size of 390 Form three students from three randomly selected secondary schools in Nakuru County, Kenya. The data was collected by use of a questionnaire (Students' questionnaire). The data collected was coded, categorized and then analyzed using descriptive and inferential statistics with the help of statistical package for social sciences (SPSS) version 22.0. Null hypothesis were tested at .05 significance level. The Study findings showed that students had positive self perception which had no statistical significant influence on biology achievement among students in Nakuru County, Kenya.

Key words; Self Perception, Biology Achievement, Science Education and Millennium Development Goals (MDG'S).

Introduction

Science Education is emphasized in Kenya's secondary school curriculum in order to produce a scientifically literate populace and professionals in science and technology. Keraro and Shihusa (2005) argue that biology makes a contribution towards this objective. Biology is a unique science in that experiments with living organisms can take place in the laboratory and in the field making the subject fun to learn. Prokop, Prokop & Tunicliffe, (2000) however pointed out that there is increased use of virtual environments instead of practical investigation in biology teaching. This perhaps has

impacted on overall achievement in biology in the Kenya Certificate of Secondary Education Examination (K.C.S.E) and at Nakuru county level as shown in Table 1.

Table 1
KCSE Biology Achievement Scores between 2011 and 2013 at National and County level.

Year	National Mean Score (%)	Nakuru County Mean score (%)
2011	32.42	35.5
2012	31.6	38.2
2013	32.3	38.3

Source: KNEC Examination Report (2012-2014); Nakuru County Education day booklet (2012-2014).

Table 1 shows that Nakuru county KCSE biology achievement scores are higher than national scores. However both scores are far below 50% meaning low achievement in biology which triggers concern among educationists. If all counties in Kenya explore various options of boosting achievement in biology like adopting measures that enhance students' self perception, then the national biology average score might go up. This study explored the influence of self perception on form three students' achievement in continuous assessment tests in biology from randomly selected secondary schools in Nakuru county. The scores used were form three end of term one, term two and term three biology continuous assessment test scores.

Biology knowledge is a pre-requisite for national development as highlighted in Kenya's blue print for development -Vision 2030. Samikwo (2013) highlighted that Kenya is lagging behind in its development agenda and such developments require workforce that achieves highly in science subjects like biology. Biology knowledge contributes in new discoveries for example in the field of medicine, population control, food security, pollution control and sustainable utilization of natural resources. Biological knowledge is also necessary to ensure natural resources are in sufficient replenishment and supply (Ongowo & Hungi, 2014).

Kenya made primary and secondary education free in 2003 and 2008 respectively. The country aimed at meeting the objectives of education for all (EFA) by the year 2015 and millennium development goals (MDG'S). However, recent studies indicate that most developing countries including Kenya are far from achieving MDG'S (Murunga, Kilaha and Wanyonyi, 2013). This necessitates acquiring of adequate biological knowledge by the students and subsequent utilization of the acquired skills so as to be in a position to participate fully in scientific development.

In science education, students should take personal responsibility and control during the learning process. A number of studies have been directed towards the affective components of cognition like motivation and self regulation. These two components are crucial in the process of cognitive engagement and conceptual change (Tang & Neber, 2008). Self perception of students has also been investigated with emphasis on self concept so as to develop and maintain positive attitude. Self perception is an important source of self concept among other sources like reflected appraisals and social comparisons.

Self perception theory (SPT) developed by Daryl Bem in 1965 postulates that people induce attitudes without accessing internal cognition and mood. However, Weiner (1999) observed that teenagers consciously or subconsciously look inward at themselves and weigh whether other peoples' thoughts, attitudes, actions and reactions will work for them until they begin to see themselves in their own way. Self perception therefore may vary from time to time impacting on academic achievement. SPT sufficiently guided this study which aimed at finding out the influence of students' self perception on achievement in biology among secondary school students in Nakuru County, Kenya.

STATEMENT OF THE PROBLEM

Relationship between self-perception and academic achievement is well established in literature but little research has been done on the topic in Kenya especially in secondary schools within Nakuru county. This study therefore aimed at making a contribution towards filling this gap. To this end the study examined the relationship between students' self perception and achievement in biology among students in secondary school in Nakuru county.

Objectives of the study

1. To determine if there is a relationship between students' self perception and achievement in biology among secondary school students in Nakuru county
2. To find out if there is a difference in self perception among male and female students in secondary schools in Nakuru county.
3. To investigate if there is a difference in biology achievement among male and female secondary school students in Nakuru county

Null Hypotheses

1. There is no statistically significant relationship between students' self perception and achievement in biology among secondary school students in Nakuru county
2. There is no statistically significant difference in self perception among male and female students in secondary schools in Nakuru county.
3. There is no statistically significant difference in biology achievement among male and female secondary school students in Nakuru county

METHODOLOGY

Design

This study was guided by self perception theory (SPT) and adopted *ex-post facto* research design which is applied in those studies where the independent variables have interacted with dependent variables. Consequently, the effect of interaction between the variables is determined retrospectively (Kerlinger, 2002).

Participants

The target population was secondary school students and the accessible population was approximately twenty eight thousand form three secondary school students in Nakuru county. Sample size was determined by formula developed by Krejcie and Morgan in 1970 (Kathuri & Pals, 1993). 390 randomly selected form three students participated in the study. Simple random sampling was used to select 3 secondary schools and 130 form three students were randomly selected from each of the participating school.

Data collection and analysis

Data was collected by use of students' questionnaire (SQ). The instrument was pilot tested in one secondary school in neighbouring Nyandarua county to test reliability. Cronbach's alpha was used to assess whether items in the instrument measured students' perception. An alpha level of at least .70 was accepted and considered suitable to make possible group inferences that are accurate enough (Orodho, 2008).

The researcher administered the questionnaire to the study sample and collected it immediately the participants completed filling in the required information. The items were scored, coded and analysed using SPSS version 22.0.

Results and discussion

Self perception among students

It was found out that most students have a positive self perception since they agree and strongly agree with positive statement on self perception and disagree and strongly disagree on negative constructed statements. Majority of the students like the person they are (96%), make decisions on their own (88%), are comfortable with their physical appearance (97%), pretty sure of themselves (78%) and always do the right things (93%). Moreover the students are not scared to talk in front of the class (53%), are not clumsy (59%) and are very agreeable (59%). In addition, 47% of the students are not sure whether their classmates like them a lot while 25% are not sure whether most times they do the right things. These findings are shown in the table 2 below

Table 2
Self perception percentages among students

perception	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
I like the person that i am	.5%	1.6%	2.3%	14.8%	80.8%
I make decisions on my own with ease	1.6%	4.8%	5.3%	45.3%	42.9%
I rely on my friends for most decisions in my life	32.6%	40.7%	10.4%	13.2%	3.1%
I like to be called upon in class	11.3%	16.8%	26.3%	33.2%	12.4%
Most of my friends like me	2.3%	1.6%	37.3%	30.8%	27.9%
I am fun to be with	3.0%	5.5%	24.3%	29.6%	37.6%
I am comfortable with my physical appearance	1.5%	1.0%	.5%	16.5%	80.4%
I am pretty sure of myself	4.6%	5.2%	12.9%	20.6%	56.7%
I often doubt myself	37.4%	30.2%	12.7%	10.9%	8.8%
I wish i was someone else	65.6%	18.5%	4.1%	5.4%	6.4%
I am scared to talk in front of the class	29.6%	23.7%	20.9%	15.5%	10.3%
Most times, i do the right things	3.4%	11.7%	25.5%	35.7%	23.7%
I rarely get worried	15.9%	23.3%	19.5%	32.3%	9.0%

My classmates like me a lot	1.8%	2.6%	47.4%	30.7%	17.5%
I can solve most problems in my life	3.1%	10.8%	17.5%	34.5%	34.0%
I rarely disagree with people around me	8.7%	25.9%	20.0%	31.5%	13.8%
I am a clumsy person	35.1%	24.1%	25.7%	4.2%	11.0%
I would never change a thing about myself	13.9%	21.6%	11.3%	11.3%	41.8%
I always try to do the right things	1.0%	1.5%	4.4%	39.7%	53.3%
I take long to adapt to something new	13.3%	26.3%	9.6%	32.3%	18.5%
i am often sorry for the things i do	9.5%	18.8%	18.3%	34.0%	19.3%
I am unattractive	52.3%	26.2%	13.0%	2.8%	5.7%
I have no problem expressing my opinion	3.1%	9.6%	19.5%	21.4%	46.4%
I am very agreeable person	3.9%	14.8%	22.3%	35.6%	23.4%

Self perception and biology achievement

The Average continuous assessment marks in biology year 2015 per student were calculated by getting the mean marks of individual scores in biology in the three school terms of the year. For the 390 students, the mean average marks in biology year 2015 is 28.08% with a standard deviation of 11.372% and a range between 8% and 69%. This is illustrated in the table 3.

Table 3

Average marks in biology year 2015

Number of students	Minimum mark	Maximum mark	Mean	Std. Deviation
390	8	69	28.08	11.372

Self perception was computed as a variable using median as measure of central tendency in the likert scale where values were assigned as follows; 1=Strongly Disagree 2=Disagree 3= Not Sure 4=Agree 5=Strongly Disagree. The study reveals that majority (51%) of students agreed upon the statements about their self perception whereas 39% of the respondents were not sure of their self perception. The Percentages of computed self perception 4-5 does indicate a clear trend of either decrease or increase of positive self perception with average marks in biology. This is as shown in the table 4. However A chi square test gives a p-value = 1.635 at $\alpha = 0.05$ level of confidence i.e. p-value = 1.635 > 0.05 the null hypotheses is not rejected therefore, no statistically significant relationship between students' self perception and achievement in biology among secondary school students in Nakuru county

Table 4

Average marks in biology year 2015* Computed self perception Cross tabulation

	Computed self perception	Total

Average biology marks								Percentages of computed self perception 4-5	
	2.00	2.50	3.00	3.50	4.00	4.50	5.00		
Less than 20	0	0	26	13	66	0	2	107	63.5
21-30	0	0	65	2	76	4	12	159	57.8
31-40	2	0	33	2	29	0	2	68	45.6
41-50	0	2	12	4	14	2	2	36	50
61 and above	0	0	4	0	6	0	0	10	60
Total	0	0	8	0	2	0	0	10	20
	2	2	148	21	193	6	18	390	

A two tailed test on Pearson correlation between self perception and average marks in biology shows that there exist a very weak positive correlation of +0.023.

Gender difference in self perception

A two tailed test on Pearson correlation between self perception and gender shows that there exist a very weak positive correlation of +0.042 almost zero to show that there is no relationship. More males than females have a positive self perception as shown by 70% and 40% respectively in the table 5.

Table 5

Gender* Computed self perception cross tabulation

	Computed self perception							Total	Percentages of computed self perception 4-5
	2.00	2.50	3.00	3.50	4.00	4.50	5.00		
Sex Female	0	0	50	4	113	6	8	181	70.16
Male	2	2	98	17	80	0	10	209	43.06
Total	2	2	148	21	193	6	18	390	

However A chi square test gives a p-value = 1.635 at $\alpha = 0.05$ level of confidence , p-value = 1.635 > 0.05 thus the null hypotheses retained. There is no statistically significant difference in self perception among male and female students in secondary schools in Nakuru county

Gender difference in biology achievement

Males outdo females in biology achievement in the grouped marks of 21-60 while females outdo males in biology achievement in the grouped marks of 61 and above (Figure 1).

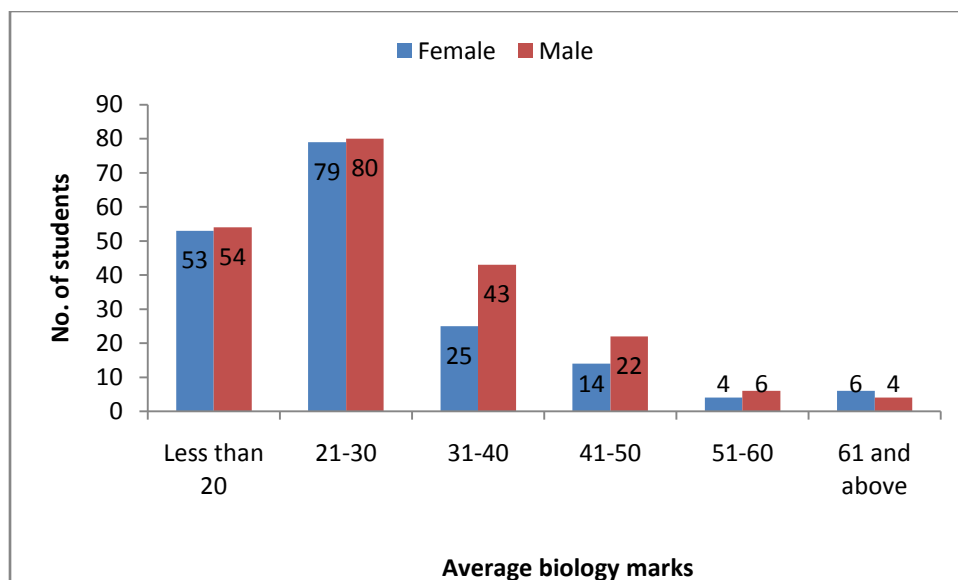


Figure 1: Gender difference in biology achievement

A two tailed test on Pearson correlation between self perception and gender shows that there exist a very positive correlation of +0.412. A chi square test gives a p-value = 0.831 at $\alpha = 0.05$ level of confidence i.e. p-value = 0.831 > 0.05 null hypothesis is retained, thus there is no statistically significant gender difference in biology achievement among students in secondary schools in Nakuru county.

Conclusions

Self perception among students is positive. Students can make decisions on their own and always do the right things. Moreover students are neither clumsy nor scared to talk in front of the class a show of self confidence. The self perception perspective that people derive their inner feelings or abilities from external behaviors was noted. However students self perception does not affect their performance in biology as per the findings of the study. Performance may be attributed to other factors for example entry behavior and negative attitude towards biology. The sex of the students had a significance influence on self perception as self perception is portrayed to vary with gender. A greater percentage of female students as compared to males score more computed self perception. Performance in biology subject does not significantly differ with the gender of the student since both mean marks of males and females students in biology coincides with the class mean mark..

Further research is recommended to find out the cause/s of low achievement in biology both at county level and national level among secondary school students in Nakuru county, Kenya.

References

- Kathuri, N. J & Pals, D. A (1993). *Introduction to research*. Educational material center, Egerton University.
- Kenya National Examination Council. (2012). *The Year 2009 Kenya certificate of secondary examination report*. Nairobi; Government Printers
- Kenya National Examination Council. (2013). *The Year 2010 Kenya certificate of secondary examination report*. Nairobi; Government Printers
- Kenya National Examination Council. (2014). *The Year 2011 Kenya certificate of secondary examination report*. Nairobi; Government Printers

Keraro, F. N & Shihusa, H (2005). Effects Of Advance Organizers On Students\' Achievement In Biology: A Case Study Of Bureti District, Kenya *Journal of Technology and Education in Nigeria* Vol. 10 (2) 2005: pp. 1-9 Retrieved from web on September 6, 2015. <http://dx.doi.org/10.4314/joten.v10i2.35709>

Kerlinger, F. N. (2002). *Foundations of Behavioural Research*. New York: Holt Reinhart and Winston. Inc

Murunga F, Kilaha K, Wanyonyi D (2013). Emerging Issues in Secondary School Education in Kenya. *Int. J. Adv. Res.* 1(3):231-240.

Orodho, A. J. (2008). *Techniques of writing research proposals and reports in education and social sciences*. Nairobi; Kenyatta University.

Ongowo, R. O., & Hungi, S. K. (2014). Motivational Beliefs and Self-Regulation in Biology Learning: Influence of Ethnicity, Gender and Grade Level in Kenya. *Creative Education, 2014*, 5, 218-227. Retrieved from web on September 9, 2015

Prokop, P., Prokop, M & Tunicliffe, S. D (2007). Is biology boring? Student attitude towards biology. *Journal of biological education* vol 42 issue.

Samikwo, Dinah C (2013). Factors which influence academic performance in biology in kenya: a perspective for global competitiveness. *International Journal of Current Research* Vol. 5, Issue, 12, pp.4296-4300, ISSN: 0975-833X . Retrieved from web on September 6, 2015. <http://www.journalcra.com>

Tang, M., & Neber, H. (2008). Motivation and Self-Regulated Science Learning in High Achieving Students: Differences Related to Nation, Gender and Grade Level. *High Ability Studies*, 19, 103-116. Retrieved from web on September 16, 2015. <http://dx.doi.org/10.1080/13598130802503959>

Weiner, V (1999). *Winning the war against youth gangs*. Greenwood publishing group press.

STUDENTS’ QUESTIONNAIRE (SQ)

This study aims at finding out the influence of self perception and academic self concept on achievement in Biology among secondary school students. Please fill in the questionnaire and the information collected will be used for academic purposes only.

SECTION A; SUDENTS’ BIODATA

- 1. Sex : Female Male
- 2. Age in years:
- 3. KCPE Marks:
- 4. Class

SECTION B: STUDENTS’ SELF PERCEPTION

Please tick the statement which describes how you feel about yourself according to the scale given. There is no right or wrong answers to these statements.

Statement	Strongly Agree	Agree	Not sure	Disagree	Strongly disagree
1.I like the person that I am					
2.I make decisions on my own with ease					

3.I rely on my friends for most decisions in my life					
4.I like to be called upon in class					
5.Most of my friends like me					
6.I am fun to be with					
7.I am comfortable with my physical appearance					
8.I am pretty sure of myself					
9.I often doubt myself					
10.I wish I was someone else					
11.I am scared to talk in front of class					
12.Most times, I do the right things					
13.I rarely get worried					
14.My classmates like me a lot					
15. I can solve most problems in my life					
16.I rarely disagree with people around me					
17. I am a clumsy person					
18.I would never change a thing about myself					
19.I always try to do the right things					
20.I take long to adapt to something new					
21.I am often sorry for the things I do					
22.I am unattractive					
23.I have no problem expressing my opinion					
24.I am a very agreeable person					

SECTION C: SELF ACADEMIC CONCEPT ASSESMENT

Please tick the statement which describes how you feel about academics according to the scale given. There is no right or wrong answers to these statements, so feel free to answer.

STATEMENT	Definitely true	True	Not Sure	Not true	Definitely not true
1.I am a hard working student at school					
2.I do my school work with a lot of ease					
3.I enjoy studying biology more than any other subject					

4.I spend most of my time doing my school work					
5.I enjoy participating in class activities					
6.I often lead my classmates in tasks assigned by our teacher					
7.My peers often consult me in class assignments					
8.I am happy with my academic achievements					
9. I can never achieve highly in biology					
10.I learn most concepts in biology very fast					
11.I have trouble with most school subjects					
12.I often need help in most school subjects					
13.I enjoy studying biology					
14.I get good marks in biology					
15.I don't like most school subjects					
16.I often look forward to biology lessons					
17.I often need help in most school subjects					
18. I really feel good about my achievement in most school subjects					
19.I hope to excel in my study					
20. My grades in biology and all other subjective will secure for me a position in university					
21.I am well aware of my future profession					
22.I have trouble understanding anything in biology					
23.Biology is the easiest subject in biology					
24.Biology is my favourite subject					
25.I never want to continue studying biology after secondary school					

Thank you for answering this questionnaire