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An investigation of Factors that Influence Performance in KCSE Biology in selected secondary schools in Nyakach District, Kisumu County, Kenya

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Abstract

This paper focuses on factors that influence the performance in KCSE Biology in selected secondary schools in Nyakach District, Kisumu County. This study was guided by the following objectives to find out the relationship between teacher characteristics and performance in Biology, to find out the relationship between teaching/learning resources and performance in KCSE Biology, to establish the relationship between motivation and performance in KCSE Biology and to find out the relationship between students attitudes towards KCSE Biology and performance in KCSE Biology. The study was significant as performance in K.C.S.E Biology has been poor over the years, hence need to find out causes.The study was guided by the systems theory advocated by Gagne and Briggs (1979). The research was conducted through descriptive survey design by quantitative and qualitative approach. The target population was seven hundred and thirty Form four students, eighteen Biology teachers, and fourteen Principals. Stratified random sampling was used to select schools, purposive sampling for selecting teachers and Principals, form four students were first stratified then selected through simple random sampling. Data was collected using questionnaires for students, teachers and interview schedules for principals. Descriptive Statistics such as frequencies, percentages, correlation analysis, regression coefficient and coefficient of determination were used to analyze data using Statistical Package for the Social Sciences Programme (SPSS). The findings were, there was positive relationship between: teacher characteristics and performance, teaching / learning resources and performance, motivation and performance, student's attitude towards Biology and performance in KCSE Biology. The study recommended that, teachers should ensure that their students perform practicals frequently on their own; head teachers should ensure that sufficient instructional materials are availed in school, teachers should always introduce motivational variables in their teachings and Biology teachers should use teaching methodologies that will promote positive attitude towards Biology.

Keywords: Relationship, Teacher characteristics, teaching/learning resources, motivation, attitude, teacher experience and qualification, performance

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Introduction

The problem of poor performance in science subjects is global as indicated by studies done by Valverde and Schmidt (1997) in USA, Landry (1998) in Canada, Fonseca and Conboy (2006) in Portugal. The Kenyan society has laid a lot of emphasis on performance tests because the immediate goal of learning is to pass tests that open doors to higher education pursuit. Success in school is determined by high passing scores in examinations.

Table 1.1: The National Performance of Candidates in KCSE Biology Examination for 2006-2010

YEAR	No. of candidates	Percentage mean score%
2006	217,657	54.89
2007	246,662	41.95
2008	270,000	30.38
2009	299,302	27.20
2010	315,063	29.23

Source: Knec Reports – (2006-2010)

From the data in the table above, it is evident that the national performance of students in KCSE Biology is relatively low in the whole country.

Table 1.2: National Percentage Passes in Biology

YEAR	High quality % Passes B+ - A	Low quality % Passes D-E
2004	12.03	36.67
2005	7.70	43.61
2006	6.13	49.64
2007	8.79	40.76
2008	5.08	34.08
2009	4.39	32.11
2010	5.88	29.40

Source: Knec Reports (2004-2010)

In the year 2004 only 12.03% attained the high quality grades B+ to A. This declined to 7.7% in 2005, 6.13% in 2006, 8.79% in 2007, 5.08% in 2008, 4.39% in 2009, and 5.88% in 2010, showing that high quality grade passes are very low. On the other hand in 2004, 36.67% of the candidates obtained low quality passes D-E. In the years 2005 it was 43.61%, 2006 it was 49.64%, 2007 it was 40.76%, 2008 it was 34.08%, 2009 it was 32.11% and 2010 it was 29.4%. The majority of the candidates had low quality passes indicating that they obtained grades below stipulated mastery of the subject matter. Learning achievement was adopted as a key indicator of education during world conference of education for all (EFA) in Jomtien, Thailand (UNESCO, 2000).Since achievement in Biology at KCSE in Kenya has been consistently low over the years, this is an indication of low quality Biology teaching/learning. The performance in Biology at KCSE for the years under review, clearly indicates that a large proportion of students who leave secondary school education cycle at form four in Kenya do not attain the basic mastery level of the secondary Biology course. Unless this trend is reversed, the prospects of attaining the goal of Kenya vision 2030 may not be achieved.

TABLE: 1.3: Biology Percentage Passes 2008 - 2010

Grade	**2008%**		**2009%**		**2010%**	
A	0.27		0.27		0.44	
A-	1.71	5	1.32	4	1.85	5.88
B+	3.1	.08	2.80	.39	3.59	
B	4.43		4.48		5.12	
B-	6.11		6.54		6.97	
C+	8.46		8.86		9.41	
C	11.32	6	11.91	6	12.35	64.65
C-	14.23	0.79	14.90	3.49	14.79	
D+	16.24		16.80		16.01	
D	17.78		17.68		16.04	
D-	13.96	3	12.66	3	11.62	29.4
E	2.34	8.08	1.77	2.11	1.74	
TOTAL	**99.95**	**9.95**	**99.99**	**9.99**	**99.93**	**99.93**

Source: Knec Report 2010

The overall candidates performance in the table above shows clearly that very few candidates obtained high quality passes, B+ to A was 5.08% in 2008, 4.39% in 2009 and 5.88% in 2010, while low quality passes D – E in 2008 was 38.08%, in 2009 it was 32.11% and in 2010 it was 29.4%, this reveals that a third of the candidates get low quality grades, which cannot allow them to pursue Biology courses in further education. In general performance in sciences has not been impressive.

Knowledge of Biology contributes towards the socio -economic development of the country. The knowledge of genetics which is a branch of Biology has revolutionized determination of paternity disputes and identity of culprits of serious crime with precision and certainty through Deoxyribo-Nucleic Acid (DNA) sequencing and profiling, (Institute of Biology, 2007)

Table 1.4 District Percentage Passes in Biology

Year	High quality passes % B+-A	Low quality passes % D-E
2010	6.2432	37.2851
2009	5.04854	35.9224
2008	8.09232	33.4286
2007	7.4382	36.2459
2006	8.1243	37.1876

Source: Nyakach District Education Days-(2006-2011)

The above table illustrates that through the years the percentage high quality passes has been below 9% while low quality passes has formed the bulk of the candidates with over a third of them. This implies that more than a third of the candidates who sat for KCSE Biology in Nyakach District, failed to meet the expected mastery of the subject matter and this locked them out of careers where Biology is a prerequisite subject.

Despite the efforts of the BOM, PAs, CDF, Government and communities, the performance in sciences and Biology in particular have not been impressive. Nyakach District has been producing very few high quality grade passes, less than 9% of students attain high quality grades B+ to A, and over 30% attain poor quality grades of D to E. Unless this trend is changed Nyakach as a district may not be able to produce students who may be admitted into high education level courses such as in Medicine, Agriculture and Environment.

The researcher feels that there are factors which may be contributing to this state of affairs of poor performance in KCSE Biology in Nyakach District, Kisumu County.

Statement of the Problem

In the background section, it has been illustrated that there has been poor performance in KCSE Biology in Nyakach District as reflected by more low quality passes of D-E above 30% between the years 2006- 2010 and very few high quality passes, less than 9% within the same period. Biology has contributed to the development of new and better drugs and vaccines against many human and animal diseases such as measles, malaria, polio and rinderpest, and it has contributed towards conservation of environment and endangered species.

Biology lays the foundation for careers in Agriculture, which is the engine for economic growth. Agriculture in Kenya earns 60% of foreign exchange and provides employment to over 70% of the population, (GoK, 2003). Biology researchers have been able to develop high yielding, disease resistant and fast maturing food crops and animals to meet the food requirements of an ever increasing world population through continuous research.

Despite the knowledge of the importance of Biology for socio-economic development of the country, the government and other stakeholders' efforts in provision of facilities and teachers, the performance in science and Biology in particular has not been impressive in Nyakach District. In view of students poor performance in KCSE Biology, there is need to establish the factors that promote good performance in KCSE Biology. Therefore the researcher specifically set out to investigate factors that influence poor performance in KCSE Biology in selected secondary schools in Nyakach District, Kisumu County.

Limitations of the Study

The study confined itself to investigating factors that influence performance in KCSE Biology. The results were, therefore, interpreted only in this context of the study. The study was limited to a small sample schools that were selected and Form four Biology students, Biology teachers and principals participated.

The study was further limited to the performance in KCSE Biology and to analyzing data given by the sources. The study had no control over the exact information students and Biology teachers chose to give or withhold. The study was also limited by inadequacy of time since the KCSE examinations were ongoing, which made the researcher to re-schedule the research process on the days where there were no examinations going on.

Materials and Methodology

The study was carried out in 14 selected secondary schools in Nyakach District, Kisumu County. It sought to capture useful data that was representative of the factors that influence performance of students in KCSE Biology in Nyakach District. The study design was descriptive survey research since it was a fact finding with an intention of establishing the truth.

There were 41 secondary schools at the time of study, of which 14 were selected for the study based on whether they were boys', girls' or mixed schools. 730 Biology students, 18 Biology teachers and 14 principals were used in the study. Owing to the varied nature of the schools, stratified sampling was used. Three categories were used for equal representation for boys', girls' and mixed schools. During sampling, 40% of the girls', 100% of the boys' and 85% of the mixed schools were used. Data was then collected from the sample selected using questionnaires and interview schedules. Both qualitative and quantitative data analyses were employed. Qualitative analysis involved derivation of explanations and making interpretations of findings and trying to establish relationships from information gathered. Quantitative analysis involved derivation of statistical descriptions and interpretations of data by use of descriptive statistics.

Results and Discussions

The study sought to examine the factors that influence performance in KCSE Biology. This was based on the premise that some factors are influential to performance in KCSE Biology. Therefore, these factors need to be understood and properly addressed in order to improve students' performance. The factors were measured by looking at the following variables, the relationship between teacher characteristics, teaching/learning resources, motivation, and students' attitude towards Biology and performance.

Teacher Characteristics Influences on Performance in KCSE Biology

72.22% of the Biology teachers had less than 10 years of teaching experience while 27.78% had over 10 years teaching experience. On academic qualification of the teachers, 27.78% had diplomas, 22.22% had either Bachelor of Arts or Science. 24.44% had B.Ed Certificates and 5.56% had B.Sc with PGDE qualification.

The study sought to establish whether or not teacher characteristics influences performance in KCSE Biology. In exploring the regularity with which Practicals were offered to students, on a Likert scale of 1= Never to 5= Always, the mean response was 3.0602, this meant that on average, practicals were occasionally administered to students. In teacher guided class discussions, the mean response was 2.322; this meant on average, students rarely participated in teacher guided discussions.

On frequency to which the students were allowed to ask questions by their Biology teachers, the mean response was 1.545, this meant that on average, Biology students were rarely allowed to ask questions by their teachers. On the frequency to which the students received prompt feedback on assignment or exams from their Biology teachers, the mean response was 2.164, this meant that on average, Biology students rarely received prompt feedback on assignments or exams. On frequency to which Biology teachers made the subject interesting, the mean response was 1.934, this meant that on average, Biology teachers rarely made the subject interesting. On frequency to which Biology teachers conducted demonstrations during practicals, the mean response was 2.355, this meant that Biology teachers rarely conducted demonstrations during practicals in Nyakach District.

The teachers who frequently administered practical had a mean score of 8.145, occasionally had 7.151, rarely had 5.145 and never administered practicals had 4.953. Teachers who always administered teachers guided class discussions had a mean of 8.145, occasionally 7.428, rarely 6.251and never administered class guided discussions 5.214. Teachers who always allowed their students to ask questions had a mean of 8.151, frequently 6.048. The study further explored the association between prompt feedback and performance, teachers who always gave prompt feedback on assignments or examinations had a mean score of 7.951, frequently 6.147, and occasionally 5.814.

Lastly the study explored the influence of association between the use of lecture method in teaching, always had a mean of 5.461, frequently 5.840, occasionally 6.751, and rarely 7.126.

The study explored the relationship between teacher characteristics and performance in K.C.S.E Biology using correlation analysis. The teacher characteristics that were explored were; Regularity of administering practicals, guided class discussions, teachers allowing students to ask questions, teachers giving prompt feedback on assignments or exams, Biology teacher making the subject interesting and teacher conducting demonstrations during practicals. The study found that the correlation between teacher characteristics and performance in KCSE Biology was 0.7193; the null hypothesis of the correlation analysis was that there was no significant relationship between teacher characteristics and performance in KCSE Biology. The p value of the correlation analysis was found to be 0.0008, meaning the null hypothesis could only be true for 0.08% cases while the alternative hypothesis that there is significant relationship between teacher characteristics and performance is true for 99.992% cases.

Given that the p – value was a value less than 0.05, it implies that at 5% level of significance we reject the null hypothesis and conclude that there is significant positive relationship between teacher characteristics and performance in KCSE Biology, such as regularity of administering practicals, regularity of administering guided class discussions, teachers allowing students to ask questions, teachers giving prompt feedback on assignment or exams, Biology teacher making the subject interesting and teacher conducting demonstrations during practicals. The teachers in Nyakach District rarely administered the above attributes of teacher characteristics; this led to poor performance in KCSE Biology. This means that improvement or increase in the practice of these teacher characteristics contributed to an improvement in the KCSE performance in Biology.

Teacher experience has a significant effect on pupil performance in primary schools and at upper secondary level. Experienced teachers have a richer background of experience to draw from and can contribute insight and ideas in the course of teaching and learning, are open to correction and are less dictatorial in classroom. Students taught by more experienced teachers achieve at a higher level, because their teachers have mastered the content and acquired classroom management skills to deal with different types of classroom problems (Gibbons et al, 1997).

Experienced teachers are considered to be more able to concentrate on the most appropriate way to teach particular topics to students who differ in their abilities, prior knowledge and backgrounds (Stringfield and Teddie, 1981). Stronge et al (2007) assert a positive relationship between teacher's verbal ability and composite student achievement, verbal ability has been considered an indicator of teacher quality. The basic logic is that teachers rely on talk to teach, explaining, questioning and providing directions. MOEST reports (2005) found that experience equips an individual with the necessary knowledge on how to tackle the challenges in a particular field. For example, high level of experience may equip the teachers with the necessary skills to change students' attitude to make them like the subject hence perform well. Highly experienced teachers have a wide range of knowledge from which they could use to enhance performance. Teachers' experience (years of teaching, attendance of in-service courses and setting and marking of national examinations), in Nyakach District majority of teachers 72.22 % had less than 10 years teaching experience hence leading to poor performance.

Teachers polish their skill over a period of time so as to perform tasks effectively as relates to mastery of content, teaching methodology and management of students. Teachers who have taught for a longer period posted better scores than those with fewer years, an indication that experience has an impact on performance. Teaching methods encompass discovery and didactic methods (KNEC, 1992).Teachers should combine both by using varied methodologies such as lecture, discussions and team teaching, their influence on output is diverse. Teachers teaching style influence performance. A teacher's teaching method may in a way determine the attitudes students will show towards a certain subject. If the teaching style is complex, students will find it hard to understand thus, develop a negative attitude towards the subject. Curriculum implementation greatly depends on the teacher who should be the implementer. If the contents are not delivered effectively to the students, there will be poor understanding which will greatly hinder achievement. Good teaching methods by a Biology teacher on the other hand, motivates students to work hard since it enhances positive attitudes and interest development among students which influences performance.

A teacher's level of education (qualification) is a very important and determinant in effective teaching and learning, and that the level of education influences performance in Biology.

This is because trained teachers have know- how in the subject to teach it effectively as they are equipped with the skills and knowledge to teach with confidence. Maundu (1986) concludes that there was significant correlation between teacher qualification and pupil performance in Kenya, the good performance was attributed to excellent instructions given by qualified teachers.

Biology practical forms paper three of K.C.S.E. Backe (2005) notes that having a personal experience in the learning process accounts for 80% of knowledge retention. Practicals help students to put what they have learned in theory into reality thus, making the subject livelier. Practicals entail application of theoretical concept by performing experiment. Having interest in something drives an individual towards working hard to achieve it. Students' willingness to participate in practical activities, especially when in groups improves performance in Biology (SMASSE INSET, 2004). This findings, just like those of SMASSE INSET (2004), show that when a teacher increases the number of times he administers practicals to his students, the performance in Biology improved. Moreover, practicals supplement good marks to these students who are weak in theory (KNEC, 2007) hence influencing the performance in KCSE Biology.

Ability to do practicals influence performance in Biology, Biology practicals are far much better than the theory papers and therefore, students who are able to perform practicals efficiently are well placed in terms of subject performance. The then KNEC secretary Juma Mwachihi, lamented candidates scripts showed they do not perform adequate practicals in sciences as required by the syllabus. The candidates failed in questions whose answers were dependent on experiments (KNEC, 2000). This observation concurs with the findings of the study that students should be capable of doing practicals because they contribute positively to performance in practical exams, at the same time improving their response to theoretical questions dependent on experiments.

Teachers' ability to give students regular assessments, help students to improve their confidence in a subject. Through assessments, they may evaluate their weaknesses and strengths towards the discipline. Regular assessments by the teacher act as performance evaluation towards students in order to determine the understanding rate of the learners. This helps the teacher to identify the learners' areas of weakness and working on that weakness helps improving their performance.

Frequent assessment helps them get rid of the examination phobias that were most likely a deterrent to performance in Biology. This implies that regular assessments are likely to initiate good performance in Biology as it will give students the necessary practice to answer questions. Regular evaluation helps students improve on concepts that have been perceived difficult. If a teacher fails to measure the level of learning taking place among students regularly, it becomes difficult to measure performance. Teacher evaluation of continuous assessment tests (CATs) for students are a powerful diagnostic tool that enables students to understand the areas in which they are having difficulty and concentrate their efforts in those areas. CATs also allow teachers to monitor the impact of their lessons on students' understanding. Using the result of CATs, teachers can modify their pedagogical strategies to include the construction of remedial activities for students who are not working at the expected grade level and the creation of enrichment activities for students who are working at or above the expected grade level. Ali (2009) observes that there was statistically significant relationship between teacher characteristics and student academic achievement. Adeyemo (2005) notes teacher characteristics influence teaching and learning in classrooms. In this study, it was found that the teachers in Nyakach District rarely gave prompt feedback on assignments or exams.

Teacher guided class discussions was rarely done, this had the effect of not enabling students to understand the topics effectively. Teachers rarely gave prompt feedback on exams or assignments this does not allow teachers to gauge the effectiveness of their teaching. Teachers rarely allowed students to ask questions, this led to poor understanding of the concepts. Teachers rarely made the subject interesting; this had a negative effect on students' attitude as well as not motivating them hence poor performance. Teachers rarely conducted demonstrations therefore the students could not develop the practical skills hence poor performance.

The Relationship between Teaching/ Learning Resources and Performance in K.C.S.E Biology

The study sought to establish the relationship between teaching/ learning resources and performance in K.C.S.E. From students responses a mean less than 1.5 meant that the teaching/ learning resources were never adequate, 1.5-2.5 were adequate, 2.5-3.5 not sure, 3.5-4.5 was adequate, a mean greater than 4.5 meant that the resource was very adequate.

On adequacy of chemicals in schools the mean response was 2.329, which meant that chemicals were less adequate. On adequacy of charts the mean was 3.07 meant that the students were split on whether charts were available or not. On adequacy of apparatus the mean was 2.272 which meant that the Biology apparatus were less adequate. On models the mean was 3.197 which meant that the students were divided on whether or not the Biology models were adequate. On adequacy of specimens the mean was 2.847 which meant that the students were divided on whether or not the Laboratory specimens were adequate. On adequacy of Laboratories the mean was 2.548, On adequacy of classrooms the mean was 2.345 which meant that students were divided on whether Laboratories and classrooms were adequate. From the opinion of teachers adequacy of chemicals the mean was 2.055 which meant the chemicals were less adequate, on adequacy of charts the mean was 3.00 which meant they were split on adequacy of charts, on apparatus the mean was 2.22 which meant the apparatus was less adequate, on teaching models the mean was 3.388 which meant they were not sure, on local specimen the mean was 2.833 which meant they were divided, on adequacy of Laboratories the mean was 3.777 which meant the Laboratories were adequate, on adequacy of classrooms the mean was 2.777 which meant they were divided. On the use of computer accessory resource in school such as use of 16mm projector film the mean was 1.22 which meant that they never use it.

The materials used by a teacher equally determine the content delivered to the students. Visual aids such as flipcharts promote learning. The materials a teacher uses determine the content the teacher delivers to the students, poor quality materials for instance neglects the changes that may have been introduced in the syllabus thus disadvantaging the students in those areas. This suggests that some of the students have negative attitude towards some of the learning materials used in Biology lessons. This implies that the materials a teacher uses not only influences the students' attitude towards Biology, but may also affect their preparation for examination purposes. This may partly determine one's performance in any given subject. High cost of teaching/learning materials may contribute to the decline in performance, for this reason, the teacher is left to instruct in a generalized manner (MOEST, 2005). In the study, the researcher found that the teaching/learning resources such as chemicals, charts, apparatus, models, local specimens, laboratories and classrooms were less adequate, this led to poor performance in KCSE Biology in Nyakach District.

It was established that the adequacy of these resources in the schools was related to the performance in KCSE Biology. It was established from a correlation analysis between adequacy of teaching and learning resources and performance which yielded a correlation coefficient of 0.418; the correlation was significant at 5% level of significance, and a p-value of 0.048 meaning that the probability of the null hypothesis being true was only 4.8% and the alternative hypothesis was 95.2%, that there is a relationship between adequacy of teaching/learning resources and performance in KCSE Biology. Bartsch (2009) had similar findings when he found that the use of learning resources such as Multimedia (MM) can be relevant in teaching various school subjects including Biology. MM involves "the use of two or more different types of instructional media in a presentation. The findings are also in consonance with those of the report by UNESCO (2008) which opined that teaching / learning materials such as text books, classrooms, teaching aids(chalk, board, ruler, protractor) writing materials and laboratories contributes to the academic performance of the learners. Also the results of the findings agree with that of Mutai (2006) who asserted that learning is strengthened when there are enough reference materials such as text books, exercise books, teaching aids and classrooms, while he further asserted that academic achievement illustrates per excellence the current use of these materials.

The implication of this result is that provision of suitable classrooms and laboratories and other teaching / learning resources can positively change teacher's attitude to teaching of Biology and make the subject very interesting, meaningful and exciting to the students and hence encourage higher performance.

Laboratory assistants are very crucial in the teaching/learning process since the teacher's ability to arrange for the practicals frequently is limited. Most schools in Nyakach district did not have a lab assistant and this led to poor performance. Availability of reading materials especially Biology books influences performance. Ideally, reading materials provided to students help boost performance because students will read wide in areas where they do not understand. In addition they will read ahead of their teachers hence enabling quick integration of the concepts. A study done by Muruguru (2000), on students' performance in Kiswahili, showed that availability of textbooks in schools contributes to high achievement. Besides widening students scope, textbooks also helps to familiarize the students with new terms and diagrams that are crucial during examination as well increasing students' confidence in the subject thereby improving the performance.

The Relationship between Motivation and Performance

A mean of less than 1.5 meant that motivational aspect in the specific question was not there, 1.5-2.5 was rarely practiced, 2.5-3.5 occasionally, 3.5-4.5 frequently and greater than 4.5 always practiced. On motivation of students through being given rewards, the mean was 2.876 which meant they were occasionally rewarded, on frequency of being allowed to go for academic trips, the mean was 4.03 means that they were frequently allowed to go for field trips, on frequency of allowing students to attend symposiums had a mean of 3.689 which implied that they were frequently allowed to attend symposiums, on rewarding students when they attained the most improved status the mean was 3.619 implied that they were frequently rewarded, on frequency of inviting motivational speakers and resource persons the mean was 3.664 meaning the school frequently invited resource persons.

On teachers opinion frequency to which students were rewarded had a mean of 3.333 meaning they were occasionally rewarded, on frequency of academic trip had a mean of 2.777 which implied that the students were occasionally allowed to go on trips, on frequency on which students were recognized the mean was 3.555 meaning they were frequently recognized when they attained the most improved status in class, on frequency of attending symposiums the mean was 2.444 meaning students were rarely allowed to go to or attend symposiums, on frequency of inviting motivational speakers a mean of 2.055 meant that schools rarely invited resource speakers.

The study found that there was a significant positive relationship between motivation and performance in KCSE Biology. The correlation between students' motivation and performance was 0.3754, p-value of 0.046, meaning the null hypothesis could only be true for 4.6% cases while the alternative is 95.4% that is there is significant relationship between motivation and performance in KCSE Biology. The finding also corroborates that of Bank and Finlapson (1980) finding which stressed that successful students have significant high motivation for achievement than unsuccessful students. The results reveal that highly motivated students perform better academically than the lowly motivated students. In this regard, a positively perceived reward induce positive motivation and subsequently realizes high achievement. The negatively perceived reward leads to negative attitude and low achievement. Good impartation of Biology knowledge in the part of the teacher coupled with students' interest in the subject and display of positive attitude are good motivating factors which when combined together is assumed will result to better achievement in Biology.

MM material like VCD and television are motivating devices when used to synchronize a lesson presentation to the experimental group in Biology produced greater academic performance in the experimental group than in the control group. In Nyakach MM instructions are virtually non-existent, this leads to poor performance in K.C.S.E Biology. In this study, the researcher found out that rewarding students as best performers, students taken for field trips e.g. Ecology, most recognized when attained most improved status in Biology class, allowing students to attend Biology symposiums, engaging resource persons to talk to students and use of MM in teaching and learning Biology were rarely practiced.

Attending symposia and exhibitions by students leads to their exposure, innovativeness and creativity which are required in the learning process (SMASSE, 2008).

This is due to the exchange of ideas that students have with their colleagues pertaining different topics. Symposia help students to be aware of different Biology concepts and questions that normally give them problems. On the other hand, Biology exhibitions cultivate the idea of innovativeness and creativity which motivates the students and therefore stimulates their attitude, ambition and interest towards the subject hence influencing performance. Students are able to gather ideas which perfect their thinking thus better understanding of the concepts. Exposure to different learning environments promotes interest in students' influencing their performance. This implies that the students in Nyakach District were not adequately motivated leading to poor performance in KCSE Biology

The Relationship between Attitude towards Biology and Performance in K.C.S.E Biology

A mean of less than 2.5 meant that they had negative attitude, 2.5-3.5 neutral and a mean greater than 3.5 meant that they had positive attitude. On students opinion on how often they consulted Biology teachers had a mean of 2.786 meant they had a neutral attitude. On frequency to which they had discussion in their groups had a mean of 3.089 this implied that they had neutral attitude, on the extent to which the students set questions for themselves and getting answers without checking test books for answers the mean was 2.667 which meant they occasionally set questions and answered them, so had neutral attitude.

From teachers opinion on whether students enjoyed learning Biology had a mean of 3.444 which meant they had neutral attitude, on whether students enjoyed having discussion groups had a mean of 3.278 meant they had neutral attitude. On whether the students enjoyed learning Biology had a mean of 3.389 implied they had neutral attitude, on the attitude of students towards use of practical to learn Biology had a mean of 3.556 which meant they had positive attitude, on students enjoying Laboratory work when engaged in hands on activities compared to teacher demonstrations had a mean of 3.556 which meant they had positive attitude, on consultation 83.33% Biology teachers confirmed that their student went to them for consultation.

There was a significant positive correlation between students' attitude and performance in KCSE Biology. The correlation analysis had a correlation coefficient of 0.5931; the correlation was significant at 5% level of significance. The kind of attitude one holds in a learning situation therefore is of great significance.

P-value 0.0198, the probability of the null hypothesis being true is 1.98% and the alternative hypothesis is 98.02%, that there is a relationship between students' attitude and performance in KCSE Biology. Attitude is the inner feelings of an individual towards something or somebody. Positive attitudes in students help to improve performance. Attitude influences ones thought which in the end affects understanding of the individual. Positive attitude activates the thinking, feeling and reacting components of an individual, hence influences the performance. On the other hand, negative attitude contributes to lack of motivation in learners hence hindering them from performing well. Positive attitude cultivates students' ambitions and morale of what they want to be in future hence, working hard under minimum supervision.

An attitude consists of three basic components, namely thinking, feeling and reacting. The thinking component involves self-belief. The feeling component involves issues related to value, and the reacting component involves the tendency to behave in a certain way. According to Driver and Bell (1986), ''the learners have the final responsibility for their learning…in that they decide what attention they give to a learning task, construct their own interpretations of meaning for the task and evaluate those meanings, Norwich and Jaegar (1989) aver that ''there is at best an explicit or implicit assumption that the attitude to school subjects should be related to achievement, if only on the grounds that positive attitude leads to greater achievement''.

It can be said therefore that interest and attitude of a learner towards a particular subject matters a lot. This is because these two constructs are high motivating factors which can lead to better achievement on the part of the learner. Students' interest influence performance in KCSE Biology, this is so because having interest in Biology cultivates students' positive attitude towards the subject, hence enabling the students to work hard.

Discussion groups help slow learners to sharpen their minds and be able to integrate complicated Biology terms that they did not understand in class. In addition, group discussion plants the virtue of commitment to members because everybody has to contribute to the discussion hence; widening their scope of knowledge. It is through discussion groups that students are able to express themselves in areas of difficulty and are able to learn new ideas from each other hence, building their capacity in the subject which affects performance.

Dr. William Glasser, who specializes in educational counseling, has estimated that we remember 10% of what we read, 20% of what we hear, 30% of what we see, 50% of what we see and hear, and 70% of what we discuss with others (Backe, 2005). Discussion as a medium for knowledge acquisition is vital. Discussion groups should be embraced more to promote good performance especially among weak students.

Proper management of time greatly improves students' performance since time wasted cannot be recovered. Kurgat (2008, p 20) notes that poor planning of personal study time may cause students to lose concentration. He advocates for proper planning as a useful study skill as it eliminates distractions and indecision in their study. Respondents mentioned during self study on the subject asking assistance from teachers in areas of difficulty, forming discussion groups, dedicating more time for the subject, having personal timetable which guides students' private studies, are some of the attributes that trigger improved performance in Biology.

The study established that an interest in Biology influences performance because it provides the drive within students to participate in learning process. Good attitude and better interest learners display particularly in Biology serve as an encouragement even to the teacher. This can help the teacher a lot to disseminate his teaching to the best of his ability and knowledge making use of all available resources, rather than resorting to the use of chalk and talk when learners show no interest or negative attitude.

Moreover, when students display good attitude and better interest in Biology, the teacher is motivated and this may cause him to forget whatever hindrances to the teaching of the subject from his own part. In the study, the researcher found out that the students had a neutral attitude towards enjoying learning Biology, having class discussion groups, like learning Biology when they are in excursions than in class, when they are engaged in practicals, laboratory work, when engaged in hands on activities; this led to poor performance in KCSE Biology.

Conclusions and Recommendations

Conclusions

From the findings and discussions, it was concluded that:

1. Poor performance in K.C.S.E Biology in Nyakach District was mainly due to teacher characteristics which included irregularity of administration of practicals, irregularity of administration of teacher aided class discussions, teachers not allowing students to ask questions, teachers not giving prompt feedback on assignments or exams, Biology teachers not making the subject interesting and teachers not conducting demonstrations during practicals.
2. Inadequate supply of teaching/learning resources such as chemicals, charts, apparatus, models, local specimens, laboratories, MM, textbooks, and libraries, led to poor performance.
3. Students in Nyakach District were motivated though to some extent more motivation is needed for not rewarding best performers, students not taken for field trips e.g. Ecology, nor recognizing students when they attain the most improved status in Biology class, not allowing students to attend Biology symposia, not engaging resource persons to encourage students, and not exposing students to different learning environments
4. contributed to poor performance in KCSE Biology in Nyakach District.
5. Students' neutral attitude towards Biology made them not enjoy learning Biology, not having discussion groups, not liking learning Biology when in excursions than in class, not enjoying Biology when engaged in practicals, hate laboratory work in hands-on activities, not asking assistance from teachers, not dedicating more time for the subject, this led to poor performance in KCSE Biology in Nyakach District.

The independent variables teacher characteristics, teaching / learning resources, motivation and attitude of students towards Biology explained 67.1% of the variance in the dependent variable (performance). The combination of the independent variables predicted 67.1% of the dependent variables (performance). This implies that a big part of the dependent variable (performance) is predicted by the combination of independent variables. On the other hand, other factors not in the study predicted 32.9% of the dependent variable (performance).

Recommendations

This study makes the following recommendations:

1. Biology teachers encourage their students to perform practicals frequently on their own which was rarely done to supplement theoretical knowledge.
2. The head teachers provide sufficient instructional materials to enable teachers improve performance in KCSE Biology.
3. Biology teachers introduce motivational variables in their teaching to enhance students' achievements in test and participation in class, allowing students to attend symposia, and taking students for field trips.
4. Biology teachers use teaching methodologies that will promote positive attitude towards Biology by encouraging discussion groups, excursions and hands on activities.

References

Adeyemo, D. A. (2005). "Parental Involvement, Interest in schooling and school Environment as Predictors of Academic Self- Efficacy among fresh Secondary School In Oyo State, Nigeria. Electronic Journal of Research in Educational Psychology, 5-3: 163-180."

Ali, A. A (2009). The Impact of Teacher Wages on the Performance of Students: Evidence from PISA mpra.u.s.unimuenchen.del/…

Bank, C. & Filampson, W (1980) Successful Motivation of Students in Academic Activities in McIleland; D.C. Appleton – century – Crafts.

Backe, D. W (2005). Joy at Work: A Revolutionary Approach to Fun on Job. Seattle, W. A: PVG

Bartsch, G.U. (2009). Multi Media and Synchronization of Instruction in Higher Education, New York; McGraw – Hill brook Company

Driver, R & Bell, B (1986). Students thinking and learning of Science: a Constructivist view: School Science review, 67 (240): 443 – 456.

Fonseca, J.M.B &Conboy, J.E. (2006). Secondary Student Perceptions of Factors affecting failure in Science in Portugal. Euratia Journal of Mathematics, 2 (1): 83 – 93. Retrieved 20th July, 2006 from http://www.ejmste.com /022006/ab5.htm.

Gagne.R.M. &L.J.Briggs (1979). Principles of instructional design New York:Holt. Rinehalt and Windform.

Gibbons, S. Kimmel, H & Oshear, M (1997). Changing Teacher Behaviour through Staff Development: Implementing the Teaching and Content Standards in Science School Mathematics; 976(1): 302-340.

GOK (2003). Natural Atlas of Kenya.5thedition.Nairobi- survey of Kenya.

Institute of Biology (2007). Annual report 2007. http://www.10b.org/user files/ar-www.pdf.

Kenya National Examinations Council (1992). Examination Report: Nairobi:KNEC.

Kenya National Examination Council (2000).KCSE News letter, Nairobi: (KNEC)

Kenya National Examination Council (2004 – 2010). KCSE Examination reports: KNEC,Nairobi.

Kenya National Examination Council Report (2007)

Kenya National Examination Council Report (2010)

Kenya National Examination Council (2006 – 2010). KCSE Examination reports: KNEC,Nairobi.

Kurgat, H. K. (2008). Five Principles of Students Academic Success. Talk presented at Moi University Secondary School, June 18th, Eldoret, Kenya.

Landry, P (1988). The Voucher System. The "Voucher" and the Public School System retrieved 16th May, 2013 from
http;//www.bluepate.com/Literature/Essays/BluePate/ Voucher.htm.

Maundu, J.N (1986). Student Achievement In Science And Mathematics: A case of Extra Provincial and Harambee Secondary Schools in Kenya. PhD Thesis. McGill
University, Monterea

MOEST REPORT, (2005). Session Paper No.1 of 2005 on Policy Framework for Education, training and research; meeting the challenges of education, training and research in the 21st Century Nairobi: Government Printers.

Mutai, B.K (2006). How to write quality research proposal: a complete and simplified receipe.NewYork:Talley Publications.
Available online at http;//www.academicjournal.org/err.

Muruguru, S.K.P (2000). Students' performance in Kiswahili: A study of selected secondary Schools in Nakuru District, Kenya. Unpublished M.phil. Thesis. Moi University, Eldoret, Kenya.

Nyakach District Education Days (2006-2010). Kisumu, Kenya.

theory of Reason Norwitch, B &Jaegar, M. (1998). The predictive relationship between beliefs attitudes, intentions and Secondary School Mathematics learning. A Action Approach. The British Journal of Educational Phsychology 59 (3); 313 – 315.

SMASSE INSET (2004). Project Paper Presented on Baseline Studies at first cycle of District INSET Uashin Gishu District.Eldoret, August 2004, Unpublished.

SMASSE PROJECT (2008). Project Paper Presented on Baseline Studies at first cycle of District INSET Uasin-GishuDistrict.Eldoret, August 2008, Unpublished.

Stringfield, S. &Teddie, C (1991). School, Clasroom and Students' Level indicators of Rural School Effectiveness. A Journal of Research in Rural Education, 7(1): 15-28.

Stronge, J.H, Ward, T.J & Tucker, P.D &.Hindman, J.L (2007). What is the Relationship Between Teacher Quality and Student Achievement? An exploratory Study. J. Pers Eval Educ. (2007). 20:165-184.

U.N.E.S.C.O (2000). World Education Forum: the Dakar framework for action, education for all; meeting our collective commitments. Unesco Paris.

U.N.E.S.C.O (2008). Challenges of implementing free day secondary Education in Kenya. Experiences from districts: UNESCO.

Valverde, G.A, & Schmidt, W.H (1997). Refocusing VS Maths and Science Education issues in Science and Technology.Retrieved 14th July, 2 http;//www.issues.org/14.2/Schmidt.htm.