How Can Institutional Capacity be Improved to Bolster Performance in Biology in Secondary Schools ?: A Focus on Eldoret Municipality, Kenya

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Abstract

This paper discusses the institutional factors that influence performance of students in Biology in Kenya Certificate of Secondary Education based on the findings of a study conducted in Eldoret municipality, Kenya. The aim is to identify ways in which negative factors can be mitigated to enhance performance in Biology as a Science subject. The study adopted an ex post facto design. A total of ten out of 30 secondary schools were sampled. The target respondents were Form Three students and teachers of Biology. The sample was made up of 225 respondents; 200 students and 25 teachers obtained by using stratified sampling technique. Simple random sampling was then used to choose the streams and particular students who participated in the study. Purposive sampling was used to obtain only the students who study Biology. Questionnaires, observations and interviews were employed to collect data, and the data collected was analysed both quantitatively and qualitatively and presented using descriptive and inferential statistics. It was established that the Biology laboratory, as a physical resource, should be: available, functional, have adequate space, have laboratory technicians and have resources equitably distributed to be an effective teaching-learning resource. Moreover, libraries also affect performance in Biology positively if they are: available, have adequate space and equipped with updated Biology text books. Furthermore, government policies also influence performance. The study is significant as it generates information that can be useful in identifying ways that schools can endeavour to build sustainable capacities for improved performance in Sciences and other subjects in Kenya.

Keywords: Improving Institutional Capacity, Bolster Performance, Biology Subject, Secondary Schools, Eldoret Municipality, Kenya

Introduction

In this paper, institutional factors relate to policies and resources (physical & human) within the school and outside the school environment, that impact on students' academic performance. These include the school facilities which are also considered as part and parcel of the teaching-learning environment, as well as the administration/management element of the school institution.

School Facilities

It is expensive to teach Sciences, unlike Arts, where the teacher only requires instructional media such as printed text to teach. Other than printed text, Sciences require a suitable learning environment. This relates to the facilities available in the school such as indoor laboratory, electricity, and outdoor laboratory such as botanical gardens, fishponds and a nature reserve for ecological studies. These facilities do not always occur naturally in the environment, and thus have to be constructed and or catered for, say, by the community and institutions. Who has ever debated the issues of community laboratories (indoor and outdoor), as is the case with the community libraries available in almost all major and some small urban centres of Kenya?

MacDonald and Rogan (1998) argue that some school environments de-motivate learning. School environments that could be de-motivating include poor physical structures such as, dilapidated buildings, environment devoid of examples of 'school' Science, and lack of facilities such as Science equipment, laboratories and libraries, particularly in rural schools.

The Science in the streams and the bush around the rural learner is rarely a part of the syllabus, that is, school Science is not part of learners' life. Most pupils find Science difficult because there are no facilities and equipment to make learning of the subject easier. This makes most of the learning theoretical, but this changes when the pupils' experiment and experience learning through participation. In most cases, they enjoy the marvels of Science while learning at the same time (*The Blackboard* 1998). Muruguru (2000, p. 29) has found that rural schools perform poorly in Sciences compared to urban schools. This is attributed to inequitable distribution of facilities and personnel, among other factors. Rural schools have difficulty in obtaining equipment and other teaching materials.

Besides, lack of teaching facilities has been a major factor behind poor performance in Sciences, as reported in the KCSE newsletter (KNEC, 2000). School facilities have been shown to have an important contribution to academic success in developing countries (Heyneman, as cited in Jepkoech, 2002, p. 35). Among the crucial facilities that promote student achievement in KCSE is availability and efficient use of a library. Eshiwani *et al*. (as cited in Jepkoech, 2002) asserts that schools with equipped libraries should have good examination performance when compared with those without libraries. This paper examines the availability and use of libraries, botanical gardens and laboratories as some of the school facilities, among others, and seeks to establish how they influence students' performance in Biology.

The School Administration

Kenya's scientific and technology potential is going to waste because school managers are getting their priorities wrong. Many schools are spending billions of shillings on irrelevant projects, while little money is invested in the teaching of Sciences the most vital subjects in preparing high school graduates for the world of careers, cited in Ministry of Education, Science and Technology (MoEST) reports (*A Lost Crop of Scientists* 2000). The result is that many students who score Grade A in various subjects at the KCPE examination fail in the same subjects four years later when they write their KCSE examinations. The former Chief Inspector of Schools – Mr. Daniel Rono – notes that various schools have buses and big buildings, but their laboratories are poorly equipped.

Inspectorate reports (*A Lost Crop of Scientists* 2000) have indicated that parents (using PTA funds) spend a lot of money to construct buildings and buy magnificent buses at the expense of providing key teaching resources that have a daily effect on learning. A school in western Kenya has been reported to have spent Ksh400,000 in teachers' houses while it does not have a microscope that costs only Ksh6,000. The Inspectorate further implores that the battle to improve Science performance will be won or lost at the principal's office desk. This is because all indicators point out that the poor performance is rooted in shortcomings in management of human and physical resources in schools. Performance as measured by examination results is a function of how the head teacher administers and serves as the evidence of the form of leadership being practised.

The most telling are reports by examination council and the inspectorate. The former Council secretary, Juma Mwachihi, says that candidates' scripts show that they do not do adequate practicals in the Sciences as required by the syllabus. The candidates fail in questions whose answers depended on how well experiments outlined in the syllabus were covered KCSE Newsletter (KNEC, 2000, p. 1). Each school is required to have a laboratory before being registered. However, many laboratories are not properly equipped. After the initial inspection of the facilities, many schools have failed to continue to furnish their laboratories with the right equipment. Some laboratories have been turned into classrooms or halls, thus betraying a lack of clear academic focus by the school managers and the governing boards (BoGs).

Basing on studies by Muwanga-Zake (1998) in South Africa, some teachers complain about principals who kept equipments in their office for inspectors to see. As such, equipment is not used, as they ought to have been in these schools. This equally portrays a lack of understanding of the importance of equipment by the school heads, and impacts directly on the teaching-learning process. Many teachers see head teachers as a parameter to performance. Some head teachers are uncooperative when it comes to buying textbooks and Science equipment and are considered to lack commitment to their duties. In schools with efficient head teachers, learning resources and facilities are available post good performance. Schools with poor management register poor performance, an observation made by SMASSE INSET participants, Uasin-Gishu (2008).

This paper examines how institutional factors, such as school administration, school policy on subject selection, KIE, KNEC and the government policy on free day secondary education, influence the students' performance in Biology.

Statement of the Problem

Academic achievement is usually established through examinations, which consist of set questions that seek to determine how much an individual perceives the subject as a result of learning. Commendable performance is an indication of effective learning. Secondary education in Kenya has been characterized by poor performance in national examinations, especially in core subjects such as Mathematics and Sciences (MoEST, 2005). There has been an outcry nation-wide that performance in Sciences (Biology included) is poor and the trend has been observed for some years. According to Professor Karega Mutahi, the former Permanent Secretary Ministry of Education (MoE), the KCSE results has portrayed poor performance in Sciences (Jebet & Naserian, 2003). The most recent outcry has been expressed through press statements by the Minister for Education after the 2008 KCSE results were released. The Minister lamented over the poor performance in Biology among other Sciences (Aduda, 2009).

Releasing the 2009 KCSE results, Prof. Ongeri, The Minister for Education, further noted there was a drop in Biology: considering it is a crucial subject. This is not news to reckon, given that the subject had recorded a drop in performance in 2008 KCSE (Siringi, 2010). There is need for scientific and technological advancement for any nation to keep in step with the world's technological growth. This will enable a nation to advance and compete effectively in economic and social growth and development. However, it is difficult to envision a developing nation being unable to achieve technological advancement with its large manpower base being ignorant or unable to handle the same technology, owing to inherent phobia to Sciences. It calls for concerted efforts to reverse this trend, if the projected growth is to be achieved.

It is therefore necessary to direct more efforts on Science education. Commitment in strengthening the teaching of Science by enhancing skills and delivery capabilities is required. This will ensure the teacher is well placed to deliver the concepts and content in a way that is understandable to the learners. In view of students' poor performance in KCSE Biology, there is need to establish the factors that promote good performance in Biology in KCSE. The aim of this paper is to highlight the major institution-related factors that influence the performance of students in Biology in KCSE examination in selected secondary schools in Eldoret Municipality with a view to recommending ways in which institutions can bolster their performance in the subject.

Limitations of the Study

The study was confined to the factors relating to students, teachers and institutions. As such, any other factor that influences performance of students which was not part of the defined parameters of the study was deemed out of scope. The results were, therefore, interpreted only within this context of the study.

The study was also limited to a smaller sample of schools that were selected and Form Three students participated. The study was further limited to the performance in Biology in KCSE and to analyzing data given by the sources. The study had no control over the exact information students and teachers of Biology chose to give or withheld. Despite these limitations, the study provides a framework for undertaking a close analysis of the relationship between teacher-related factors and academic performance in schools and recommending appropriate interventions.

Materials and Methods

The study was carried out in 10 selected secondary schools in Eldoret municipality of Uasin-Gishu County in the Rift valley Province of Kenya. Eldoret municipality comprises parts of Eldoret East, Eldoret West and Wareng Districts. It sought to capture useful data that was representative of the factors that influence performance of students in Biology in the three districts (currently Uasin-Gishu County). The study design was ex-post-facto. This is a design in which the study variables are not exposed to direct manipulation or intervention on part of the research. However, the author provided as much control as possible under the existing conditions. The research control was limited to the responses to specific category of form three students in the selected schools.

There were 30 secondary schools within the municipality at the time of study, of which 10 were selected for the study based on whether they were boys', girls', or mixed schools. Biology teachers in the selected schools at the time of study were involved. Two hundred students and twenty-five teachers were used in the study. Owing to the varied nature of the schools, stratified sampling was used. Three categories were used for equal representation i.e. girls', boys' and mixed schools. During sampling, 75% of the girls' and 100% boys' schools were used while 20% of the mixed schools were used.

Simple random sampling was used to select the schools in the girls' and mixed category. Data was then collected from the sample selected using observations, questionnaires and interviews. 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 interpretation of data by use of descriptive statistics.

Results and Discussion

The institution-related factors influencing performance in Biology were measured based on a number of categories. First was laboratory: the factors measured included the availability, frequency of use, equitable resource distribution, adequate space, provision of botanical gardens and having laboratory technicians. Second was library: the aspects considered included the availability, updated text books, adequate space and availability of funds to operate the library. Third was the school: the variables included subjects that are made compulsory, organization of symposiums, experiments and field trips, adequate number of Biology teachers and head teachers' attitude. Fourth was Government: the variables investigated included policy on Science education, free day secondary education (FDSE), KNEC exams and syllabus changes by KIE.

Laboratory Availability

An unfriendly school environment influences performance (MoEST, 2005). Since Biology is a practical subject, availability of a laboratory is necessary to help run these practicals. Thus, the study sought to identify whether laboratory availability influences performance in Biology. Results showed 191(84.9%) of the respondents were of the opinion that availability of laboratory influences performance. Biology practical is an integral part of Biology study in secondary schools. For students to perform practicals, a laboratory which is fully equipped is required. According to the respondents, availability of a laboratory helps them to perform more practicals which in the end, improves their practical skills thus, influencing performance. Lack of facilities is a major factor behind poor performance in Sciences (*A Lost Crop of Scientists* 2000), lack of a laboratory implies that students will have limited exposure to practicals which in the end will lower the performance because students will be unable to confidently handle practical exams.

All the schools that were visited had a laboratory; this was observed and noted by the author. MacDonald and Rogan (1998) assert that the school environment has an influence to the learning of Science. School environment could be encouraging or discouraging to the learning process, Science environment relates to physical facilities and Science equipment.

Equitable Laboratory Resource Distribution

Availability of a laboratory alone is not enough to better students' performance unless it is equipped with the required resources. The study sought to identify whether equitable resource distribution in the laboratory influences performance in Biology. It was established that majority (78%) respondents were of the opinion that equitable resource distribution in the laboratory influences performance. A well equipped laboratory contains all the samples, reagents and specimens required for running the practicals. This in turn helps students to be conversant with varied practicals which are usually examined by KNEC using different approaches. The laboratories observed during the study indicated scanty resources, on inquiry it was established that some apparatus and reagents were obtained from the Chemistry department. Biology as department did not have some apparatus and reagents.

On the other hand, unbalanced resource distribution in a laboratory provides little exposure to the students in terms of practical performance and therefore, students will lack confidence to effectively handle Biology practicals. This in the end will affect performance. During an interview with of one the respondents from one of the District secondary schools under study said, "Since I came to this school, I have never done any Biology practical because our teacher normally claims that there are no equipments in the lab while at the same time he is expecting us to pass the exam." The implication is that the school administration cares less about students basic necessities required for them to perform better.

Laboratory resources should be equitably distributed if not fairly allocated across the Science subjects. Failure to do so leads to some laboratories lacking sufficient apparatus and reagents which are necessary to carrying out experiments thus affecting performance.

Frequency of Laboratory Use

The operation or running of a laboratory facilitates Science learning through practicals. A friendly environment is vital for Science learning (MoEST, 2005). If the laboratory is not put into use, it is non operational. The study sought to establish whether or not frequency of laboratory use influences performance. It was established that majority (73.3%) or 165 of the respondents were of the idea that frequency of laboratory use influences performance in Biology. According to the respondents, regular use of the laboratory enables students to get used to the laboratory environment, practical rules and procedures as well as building enough confidence which is very important in improving Biology performance.

Conversely, a Biology laboratory that is idle lowers student performance in the subject because students do not benefit from it in any way and therefore, they will have no ideas concerning practical requirements. Many school laboratories are turned into classrooms or halls by head teachers betraying a lack of clear academic focus (*A Lost Crop of Scientists* 2000). Basing on the observations made during the study, most schools had laboratories but they were not put to regular use. Upon inquiring from some teachers, the admitted that they were comfortable carrying out demonstrations and some practicals in the classroom.

Laboratory Having Adequate Space

A spacious laboratory is normally recommended for efficient handling of practicals. The study sought to establish the extent to which laboratory having adequate space influences performance. It was established that 52% (117) of the respondents confirmed that spacious laboratories influences performance. One of the reasons given by respondents was that a spacious laboratory gives them ample time to interact with practical apparatus without interfering with others. In addition, ample spacing in the laboratory enables the teacher to be able to attend to every student and be able to assess areas of weakness that some students may have thus, sharpening their performance in the subject. On the other hand, limited space in the laboratory causes overlapping and overcrowding of students during practicals which in the end leads to inefficient results brought about by inconveniences and dependency because some students will do what their colleagues are doing but not according to the practical procedures provided. Handling experiments at individual level enhances personal experience. Spacious laboratories are able to admit the whole class at one go, allowing for comfortable working space between students, enhancing their learning and minimizing time lost with the use of shifts. Respondents also noted that spacious laboratories helped reduce risks of accidents. Observations made during the study indicated that some schools had adequate laboratory space to accommodate their class size, while some schools did not have enough space to cater for the large class size. This made it difficult for the management of practical sessions.

On the contrary, 34% of the student and 36% of the teacher respondents indicated that adequate space in the laboratory cannot influence performance because according to them, practicals should be done in shifts of few students for better integration of concepts since a teacher will manage to address students' weakness. They further asserted that students should work in groups since they are able to discuss the results in a group setting improving their understanding and hence performance.

Botanical Garden as a Teaching and Learning Resource

Secondary schools should have botanical gardens among other teaching-learning resources to help students relate class work and reality. Thus, the study sought to identify whether botanical gardens as a teaching and learning resource is likely to influence performance in Biology. It was established that 48.4% (109) of the respondents agreed that utilization of botanical gardens in teaching and learning of Biology has influenced performance in Biology. According to the respondents, botanical gardens enhances effective teaching since real plant specimens are used which makes learning much more interesting hence, promoting better understanding. One of the respondent, who was interviewed during the study said, "*Kwa maoni yangu botanical garden ni ya muhimu sana kwa sababu mimi nilikuwa nimeshindwa kuelewa scientific names ya mimea, lakini nilipofunzwa nikiwa kwa garden, nilielewa kila kitu*" (in my opinion, botanical garden is very important because I was unable to understand scientific names of various plants while in class, but I fully understood them when we were taught from the garden). This finding is significant to the study because botanical gardens provide real situations that help to achieve lesson objectives that relate to plant organisms for example, experiments on photosynthesis and the concept of classification. The better understanding of these concepts influences students' performance.

Having Laboratory Technicians

Every school laboratory should have qualified personnel for it to be more effective and to operate smoothly. Laboratory technicians are necessary support staff in schools that help in preparation for practical lessons. Thus, the study sought to establish whether having laboratory technicians influences performance. It was found that 60% (135) of the respondents agreed that having laboratory technicians influences performance in Biology. According to the respondents, qualified laboratory technicians make it easy for practicals to be administered by making sure that every requirement is put in its appropriate place, making work easier for the teacher while at the same time saving precious study time that would have been lost if a teacher was to arrange the practical materials. This eases the teachers' burden motivating them hence more practicals conducted, influencing student performance in Biology. However, 27.8% (66) of the respondents disagreed that having laboratory technicians influences performance in Biology because to them, a teacher should be familiar with all practical procedures in order to enhance efficient results than when a laboratory technician is used.

Library Availability

It is important for secondary schools to have libraries to enhance good reading environment and culture. The study sought to determine whether having a library influences performance. It was found that 69.7% (157) of the respondents agreed that availability of library influences performance. According to the respondents, a library provides a good atmosphere for studies to take place since it is so quiet and peaceful.

One of the respondent had this to say: "*mimi napenda kusoma bio nikiwa lib kwa sababu nikiona nimechoka, nasoma kitabu chochote cha hadithi au gazeti ili nipumuzishe akili kisha baadaye niendelee*" (I love reading Biology from the library because when am tired I normally switch to story books or reading newspapers just to refresh the mind before I resume.) Respondents further asserted that library facilities offer students room to focus and concentrate during individual study at free time and scheduled sessions. Schools offering a wider range of optional subjects at forms three and four provide for free lessons. Students will then utilize such times for private study in the library thus influencing their performance. Few schools sampled for the study did not have libraries, but bookstores that they referred to as a library.

Having Library Equipped With Biology Textbooks

Availability of an equipped library enables students to have a wide access to different books which are very important in diversifying their knowledge. Educationists have long recognized the important role of text books in the learning process. Textbooks are the most important learning resource (Muruguru, 2000). The study sought to establish whether having library equipped with Biology textbooks influences performance in Biology. It was observed that majority (82.2% or 185) of the respondents agreed that having library equipped with Biology textbooks influence performance in Biology. Students will be able to consult textbooks in areas where they did not clearly understand in class. In addition, through Biology textbooks, they will be able to widen their scope of knowledge because they will be able to read even those important areas that were left out during class sessions. Some of the schools used during the study did not have an adequate number of Biology textbooks to cater for the entire Biology student population, except for few course books that were shared among the students. This is a worrying trend that poses concern to how the teaching and learning material vote head is utilised, it is expected that the student to text book ratio should be 1:1.

Availability of different Biology textbooks help students to compare difficult topics using various books and as a result, they end up understanding those topics much better. This improves performance in the subject. Twenty-nine (14.5%) of student and 3(12%) of teacher respondents disagreed to the statement that availability of Biology textbooks in the library influence performance, according to them teachers notes are enough for them to pass the exam since according to them, what is important is passing the exam. One of the respondent during an interview asked, "where will I get time to read through volumes of textbooks when the notes I have, are too much for me to peruse through?"

Having a Library Equipped with Updated Syllabus Textbooks

Currently, syllabus change by the government is done often which therefore calls for secondary schools to update their libraries in order for them to suit the syllabus change. Owing to this reason, the study sought to establish whether having library equipped with updated syllabus textbooks influences performance. It was observed that majority (71.1% or 160) of the respondents agreed that updated syllabus textbooks influence performance.

Students will be conversant with the new syllabus requirement and therefore be able to perform better since they hold the content. Moreover, an updated library motivates student to do more research hence improving their knowledge and skills in the subject and therefore, students become more independent.

Library with Adequate Space

A friendly school environment promotes learning. The study sought to determine whether having a library with adequate space influences performance; it was found that 51.1% (115) of the respondents agreed that a spacious library influences performance. Interviewees were of the opinion that students will be able to carry out their personal studies in a quiet environment hence motivating them to read. A spacious library encourages learners to read during their own free time, research more hence improving their study skills. The study revealed through the observations made relating to the library space, some schools had very small rooms that were utilised as libraries thus only accommodated few students at a time. However, 38.5% (77) of students and 20% (5) of teachers interviewed indicated that spacious libraries do not influence performance because students can study in classroom or outside and not necessarily utilize the libraries. It emerged that availability of library has the greatest influence on performance (30%), followed by equipped with text books covered (26%) and then adequate library space (25%). A library equipped with updated text books has the least influence (19%).

Availability of Funds for Operating the School Library

Libraries require funds for them to be equipped with new books that suit the current syllabus. Thus, the study sought to identify whether availability of funds for operating the library is likely to influence performance. Only teacher respondents were used to validate this statement. Majority (72%) of them agreed that availability of funds to run the library influence performance. With continuous syllabus revision by the government, schools need to purchase latest textbooks to match the syllabus change. This helps to improve performance because learners will be familiar with new concepts and new approaches that Kenya Institute of Education has directed. Moreover, availability of funds enables the school to purchase enough reading materials for every student thus, motivating learners to work hard since there will be no shortage of textbooks. Availability of reading materials is positively related to student performance in examinations (Heyneman, 1981). However, 16% of the respondents did not understand how the school can use funds available to improve performance in Biology.

Biology Being Made Compulsory by Schools

The KNEC requires that students are examined in a minimum of two Science subjects. Some schools develop an internal (school) policy stating the Science subjects to be studied by students. The study sought to determine the extent to which Biology being made compulsory by schools influences performance. It was found that, 41.7% (94) of the respondents indicated that Biology being made compulsory does not influence performance. Respondents indicated that there are those students whose future specialization does not depend on Biology. For instance, students who have an ambition of becoming engineers will apply minimal Biology compared to Physics and Mathematics. Therefore, if Biology is made compulsory, then those students who are forced to study it will develop a negative attitude towards the subject hence, affecting the performance.

However, 43% (86) of the student and 32% (8) of teacher respondents agreed that Biology being made compulsory by schools influence performance in Biology because according to them, all students will be required to study it and therefore, they will have no reason/excuse than to work hard thus influence their final results. Moreover, Biology is a subject that explains how the human body functions; hence, it is wise for all students to study it in order to understand the physiological functioning of their bodies and appreciate living things. More so, understanding themselves better, thus helping them to solve issues they encounter in life. This life application of knowledge taught in Biology lessons improves their confidence hence influence performance.

Having Enough Biology Teachers

Teacher-student ratio is very important if success is to be achieved. When teachers are overworked they are fatigued. The study sought to know whether having enough Biology teachers' influences performance in Biology. Majority (70.2% or 158) of the respondents agreed that having enough Biology teachers influences performance in Biology. Respondents noted that students will be able to complete Biology syllabus on time and embark on serious revision which in the end helps to improve performance.

Secondly, having enough Biology teachers influences performance in that some teachers will specialize in certain topics and deal with them thoroughly, enabling students to understand such topics effectively. However, 23.5% (47) of the student and 16% (4) of teacher respondents disagreed. The study notes that overstretching of few teachers contributes to poor performance in Biology in schools.

When a school has enough Biology teachers, the work load is distributed equitably leading to each teacher having manageable lessons, giving them more time to prepare, administer, supervise and evaluate the class effectively throughout the term. Team teaching can also be employed to cover for situations where a teacher is away from school, which influences performance. The observation of KCSE results as showed through the document analysis of the school's KCSE analysis indicated that, schools that have more than one teacher recorded higher mean scores than those with only one teacher. Majority of the student respondents when they were interviewed said that team teaching by the teachers was an advantage to them because they were able to understand better as teachers taught the topics they clearly understood. Lessons were also covered despite a teacher's absence.

School's Ability to Organize Symposiums, Experiments and Field trips

Organization of symposiums, experiments and field trips by schools widens students' knowledge of the subject. The study sought to establish whether schools ability to organize symposiums, experiments and field trips influence performance in Biology. Majority (74.2%) or 167 of the respondents agreed that symposiums, field trips and experiments influence performance. Organization of symposiums and field trips leads to students' exposure, innovativeness and creativity which enhance performance. Organization of symposiums by the schools helps students to learn new concepts and new ideas that they did not know initially through exchange of ideas with their colleagues. Field trips on the other hand, highly contribute to learning because students are able to recall what they saw in relation to the subject. In addition, field trips change the learning environment of learners thus, refreshing their minds from class activities. Experiments help students to prove what they learned in class practically hence integrating theory and practical which in the end, improve performance in the subject. Biology, being a natural Science, is effectively conceptualized when students are exposed to real life situations; therefore, developing skills, attitudes and interests in the topic of study. Symposiums provide students with opportunities to interact and teach their peers within the school or outside the school. Learning experience by teaching another is enhanced resulting into 95% retention of the learned concept (Bakke, 2005).

Head Teachers'/Principals' Attitude

Head teachers and principals normally determine resource allocation to different departments in schools. This therefore implies that if their decisions are biased, resources will be allocated unequally. Owing to this reason, the research sought to find out the extent to which teachers/principals attitude is likely to influence performance in Biology. It was observed that, 45.3 percent (102) of the respondents disagreed that head teachers/principals attitude is likely to influence performance in Biology. This is because in most cases head teachers are not in direct contact with students as most of them do not teach. As a result, the head teachers have little or nothing to contribute in terms of students' attitude and their participation in Biology. There are some situations where a head teacher is seen only once in a month or a week. Owing to this reason, students were not in a position to determine whether his/ her attitude influence performance since they hardly interact.

In an interview with one of the respondents to find out her views about head teachers' attitude, she said that: "We normally meet our principal once or twice a week so how will we know if his attitude can influence performance? Even if the principal does not like Biology but our teacher is good, will it stop us from performing well? As for me I feel the head teachers attitude doesn't really matter." From this, the student was of the point that head teacher's close interaction with his students was very important in determining his attitude towards Biology. However, 100 (44%) of the respondents agreed that head teachers/principals attitude is likely to influence performance. This finding in significant because in most cases the head teacher determines the allocation of basic resources like textbooks and other reading materials that are important in influencing performance.

Hence, if the head teacher has a negative attitude towards a certain subject like Biology, then it will be hard for students to perform well because most requirements needed especially those for practicals will not be provided. Some teacher respondents were of the opinion that some head teachers do not appreciate the need for facilities such as laboratories, libraries and acquisition of text books and other teaching-learning materials.

As a result, funds that would have been used to acquire or build these facilities are diverted to other vote heads. Muwanga-Zake (1998) notes that some head teachers even keep laboratory equipment in their offices to show off during school inspection, limiting their usage. This hinders learning, affecting performance. Some head teachers as reported in the KCSE newsletter (KNEC, 2000) convert laboratories and libraries to other uses, depriving the school of these vital facilities. Symposiums, experiments and field trips cover the largest proportion (33%) this implies it is the most influential school factor. A subject being made compulsory by the school has the least effect (18%).

Government Policy Regarding Sciences and Arts

The government of Kenya (GoK) has been on the move to encourage students to put more emphasis on Sciences, Languages and Mathematics. As a result, the study sought to establish whether government policy regarding Sciences and Arts influences performance in Biology. It was identified that 118 (52.4%) of the respondents agreed that government policy over Sciences and Arts influence performance in Biology. The GoK has set a target of becoming industrialized by the year 2030. This therefore has made the government to encourage the study of Sciences which aids in the modernization of the country. The world is dominated by technologies, forcing every nation to strive to keep abreast with scientific and technological advances besides integrating it into its education system (Jebet & Naiserian, 2003). Respondents supporting this statement said that emphasis by the government on students taking at least two Science subjects help prepare them for the jobs market. The students get prepared to join tertiary education institutions and fit into the courses that have a demand in the job market in line with the government goals of vision 2030.

The government policy relating to free day secondary education (FDSE), which was implemented in 2008, led to funding of secondary schools by the government which made it possible for schools that lacked funds due to poor payment of fees, to purchase the basic requirements for teaching and learning. For example, textbooks, exercise books, laboratory apparatus and reagents, among other resources. Thus, as a result, students were able to access text books from school libraries and at the same time, they were able to carry out practicals which are crucial in KCSE assessment. Studies indicate textbook availability showed improvement in academic performance among learners in western Kenya (Eshiwani, 1993). However, 25.5% (51) of the student and 20% (5) of teacher respondents had no opinion since they were not aware of the main objective of the government of ensuring students to learn at least two Sciences effectively to at least meet the 2030 Vision of a scientific and technological country.

Free Day Secondary Education Programme

Investment in education is an important strategy that addresses social and economic inequalities. Kenya is characterized by large inequalities with respect to income distribution, constraining economic growth; government funding education is therefore justified (MoEST, 2005). With the introduction of subsidized secondary education programme, majority of the schools have had access to school basic needs like textbooks since the government provides funds for these schools (SMASSE INSET, Uasin-Gishu district, 2008). The study, therefore, sought to establish whether government FDSE programme is likely to influence performance. It was observed that 118 (52.4%) of the respondents agreed that government FDSE programme influenced performance in Biology.

Respondents indicated schools (especially district schools) obtained funds which helped them to purchase adequate textbooks and other teaching-learning materials which helped in boosting performance in the subject. In addition, schools were in a position to purchase all the practical equipments which led to carrying out of effective practicals that later improved performance in the subject. Extra funds had been used by the school Boards of Governors (BoGs) to employ more teachers which helped to distribute the workload among teachers hence effective teaching through reduction of student-teacher ratio. Government funding has helped minimize disparities between schools thus influencing performance.

However, 33.5 percent (67) of the student and 28 percent (7) of teacher respondents disagreed that government FDSE program is likely to influence performance because according to them; introduction of FDSE has led to increase in student population which has worsened performance since teachers are unable to effectively handle each student thus, it is very difficult for the teacher to identify learners' areas of weakness. Respondents also disagreed due to lack of clear understanding of the objectives of FDSE programme, while others differed with its implementation citing delays in disbursements as an impediment to improving performance.

Exams Set by KNEC

Examinations are a way of assessing student's capabilities and understanding in any subject. KNEC normally sets a standard examination that covers all the areas in the KNEC syllabus. The study therefore sought to find out whether exams set by the KNEC influence performance in Biology. One hundred and thirty-two (58.6%) of the respondents agreed that exams set by the KNEC influence performance.

The KNEC exam covers the Biology syllabus (both KNEC and KIE) irrespective of whether student completed the syllabus or not. The KNEC sets exams on the basis of the KNEC syllabus and mark exams as per the requirements they outline during training and moderation of exams by the KNEC examiners. It is therefore important for the Biology teacher to be conversant with both the KIE and KNEC syllabi and also techniques on marking to guide students properly on how to handle questions during exams thus influencing their performance.
In an interview concerning the KNEC exams, one respondent said that: "to me the exam set by Kenya National Examination Council is not hard. In fact, the examiners are very friendly but the problem arises only if our teachers have not exploited the syllabus." The implication of this statement is very clear in that, students face their final exams confidently only if they have completed the syllabus.

Syllabus Changing by KIE

Periodic syllabus changing is important in updating education curriculum. However, these changes may impact differently on individual subjects performance depending on the duration taken to implement the change. To establish the validity of the above statement, the research, sought to know, whether syllabus changing by the KIE influence performance. Majority (70.7%) or 159 of the respondents agreed that syllabus changing by the KIE influence performance in Biology. Syllabus changing is done time after time, depending on the emerging national and societal needs. Interviewees indicated that some teachers on the ground who are more familiar with the previous/old syllabus do not bring about the changes immediately thus, jeopardizing learners' performance (giving them extra or denying the recommended content).

According to the respondents, syllabus change should allow students time to accommodate the changes implemented in the new syllabus before they sit for their final exams. A syllabus change without a proper work plan in schools has an impact on performance. Usually syllabus changes affect forms one and three. At form three students have to manage the changes within two years before writing their final exam which does not give them enough time to adapt to the changes thus affecting their performance. The new curriculum (alternative-B) offering simpler Mathematics and general Science, seems to defeat the purpose because schools are only to offer either of the options (A or B) (Siringi, 2009, p. 39). This implies some students may be disadvantaged depending on the option a school selects. In the view of the findings, the KIE curriculum (syllabus) changes have the greatest influence on performance (31%) while policy on Science education and subsidized secondary education has the least effect (22%).

Conclusion and Recommendations

The institutional related factors affecting performance in Biology in Eldoret Municipality indicated that laboratory as a physical resource should be: available, functional, have adequate space, have laboratory technicians and have resources equitably distributed to be an effective teaching-learning resource. Libraries also affect performance in Biology positively if they are: available, have adequate space and equipped with updated Biology textbooks. Government policies such as the Science education and the FDSE policy influences performance. Policy on Science education mandates students to study at least two Science subjects, since most students' dread Physics then Biology is selected as a last resort. FDSE policy has promoted improved performance by enabling schools secure teaching and learning resources which were otherwise difficult to come by. Based on the conclusions above, the author recommends that, firstly, the government funding should continue, be released on time and be increased to cater for facilities needed in schools. In addition, schools should establish friendly discipline mechanisms which involve all stakeholders (parents, school neighbours and BoGs). The government should also involve all stake holders to improve performance because students environment are both at school and home. Government can also introduce computer assisted learning (CAL) or integrate ICT in the teaching and learning of Science to all schools which will facilitate learning by using programs like Encarta and also provide electrification, water and security to schools; hence provide an environment conducive to learning.

Secondly, funding for field trips/excursions/external symposiums/exhibitions can be done through CDF funds for example, buying buses for constituencies to be used by schools for field trips; solving transport problem for schools that do not have means of transport. These recommendations would encourage institutions concerned; teachers and students to appreciate Biology as a useful Science subject thus strive to excel in the same. The author of this paper believes that embracing factors that promote good performance would improve performance in Biology among students in secondary schools in Eldoret Municipality.

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