OVERVIEW OF GIRLS' PERFORMANCE IN BIOLOGY SUBJECT IN KENYA CERTIFICATE OF SECONDARY EDUCATION: WHAT IS THE WAY FORWARD?

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Abstract: The Kenyan government in collaboration with Japan International Co-operation Agency (JICA) launched Strengthening of Mathematics and Science in Secondary Education (SMASSE) project in July 1998 in an attempt to provide remedial measures. However, the extent and scale use of the instructional strategies (the ASEI and PDSI strategies) applied is unknown. This arises from the predominant view held that performance in science subjects is still far below average and boys have always performed better than girls specifically in biology. It's apparent that under-achievement of girls in biology is an inefficiency of educational systems. As we seek to learn more about what is possible, what works for the girl child and what does not in biology performance in Kenya Certificate of Secondary Education (KCSE, we now turn to teachers. The study was guided by the constructivist theory of learning. Specifically and chronologically, this reflective paper attempts an overview of academic performance of girl child in biology in secondary schools in Kenya in a period of six years (2014-2019). The study was based on the (KCSE) examination results obtained as secondary data from the Kenya National examinations Council. The study gives an overview of instructional strategies/practices best suited in the teaching of biology. Literature review on factors impacting performance of girl child in biology is done. Conclusions and recommendations were based on literature review. The review contributes to the creation of knowledge that will be used by policy makers in reference to SMASSE in improving girl child performance in Biology. The review also helps the school administrators and educational policy makers to acknowledge the existing challenges of girl child performance in Biology and learning means of tackling teaching them in schools. The review helps the MOE and curriculum developers to know influence of teacher competency/instructional strategies/practices culture and learner attitude in girl child performance in Biology thus become the basis of curriculum innovation and improvement.

Keywords: Academic Performance, Biology, Girl Child, Secondary Schools

Introduction

Globally, Science is recognized widely as being of great importance internationally both for economic well being of nations and because of the need for scientifically literate citizenry. Academic performance is the basis of educational success of a learner in the coming days as seen in Kenya and other nations that have taken education as a critical passage to social, economic, and political growth. Eradicating biasness in education between women and men has been a precedence of the international community and development organizations such as the United Nations. Education policymakers have to be aware of the differences in academic achievement between the sexes to ensure the success of any subsequent policies in achieving quality education and equity (Nasr, 2011). World Bank (2005) noted the importance of educating girls in attaining development goals. Equality of learning opportunities between men and women is also accredited in the Universal Declaration of Human Rights of 1948.

A survey called International Study of Evaluation of Educational Achievement (UNESCO, 2003) shows a gender gap in favour of boys in many countries of western and Eastern Europe, Asia and North America. While studies in developed countries have indicated that gender difference in examination performance are diminishing. For instance in the United Kingdom where most secondary schools are mixed and girls perform better than boys. Similarly in United States of America, academic data shows that girls are achieving higher grades in class just like boys in mixed secondary schools (World Bank, 2002). Such large surveys have not been conducted in African countries. But some small scale studies from African countries such as Kenya (UNESCO, 2011), Nigeria, Uganda and Tanzania all show that girls under achievement exist in many African countries. Additionally,teachers' attitude towards girl students and teaching methods have significant implication on the girls' school performance.

The Education for all decade which culminated at the World Education Forum from 26-28 April 2000 in Dakar, Senegal, adopted the Dakar framework for actors' Education for All. The Education For All 2000 assessment

represented an unparalleled effort to take stock of the state of basic education in the world. The Forum produced a document, meeting our collective commitments, which committed governments to achieve quality basic education for all by the year 2015. Particular emphasis was put on girls schooling and a pledge from donor countries and institutions that no country seriously committed to basic education would be thwarted in the achievement of this goal by lack of resources (World Education Forum 2000).

Various aspects contribute to girls' poor academic performance in science subjects and technology-based activities in Kenya (UNESCO, 2011). Things make girls lack desire in science-related activities include lack of relevant policies that support them, and negative socio-cultural attitudes and practices. Therefore, the achievement of gender parity in science and technology should depend on a relevant plan based on lessons acquired from best practices and experiences at all levels from regional, national to international (UNESCO, 2011). More boys than girls have a tendency of preferring scientific and technological subjects in schools. Their academic performance in these subjects is better compared to that of girls due to the attitude they have towards them. After school, boys pursue careers in the field of science and technology. This is a worldwide phenomenon, common to various educational systems and hence is a much-researched area.

According to the Ministry of Education; Kenya (2015), performance in Biology at KCSE has been poor (MOE, 2015) despite its key role in industrialization and other sectors of the economy. Additionally, poor academic performance by girls in science subjects where biology in particular in Kenyan secondary schools has been a persistent problem. It generally concurs that in the current knowledge economy society; science, technology, and innovation play a primary function towards the attainment of the Millennium Development Goal. It was on this basis that the study attempts an overview of academic performance in biology of girl child in secondary schools national examinations in Kenya.

Theoretical Framework

The study was guided by the constructivist theory of learning. The theory advances that the learners use their previous knowledge to construct their own new knowledge (Kersley, 1994). According to the theory, learners easily engage in sense-making activities if they begin by examining what they already know. They are then ready to construct their own ideas if the teacher provides conducive learning environment. The students are thus responsible for their learning. The responsibility of the teacher is to create a suitable learning environment for the learners to be able to raise questions and seek out solutions to such questions by designing and performing investigations as an empirical basis for constructing knowledge. The teacher is thus a facilitator of learning to the learner and provides the teaching resources that help the learner to raise questions and conduct investigations. A good classroom environment promotes students' curiosity, rewards creativity, encourages questioning and promotes meaningful understanding through the construction of knowledge. Group work is a component of such classroom environment that involves students in collaboration and dialogue as they construct new knowledge together. Meaningful learning of biology is therefore a product of three interacting components, the student, the teacher and the learning environment. If well planned and executed in lessons the three components promote meaningful and permanent learning among the learners. The narrative study attempted an overview of academic performance in biology of girl child in secondary schools national examinations in Kenya.

Literature Review

Academic Performance in Biology of Girl Child and STEM Pedagogical Strategies/Practices

Studies conducted globally indicate that the pivotal role played by laboratory work in enhancing science concepts' teaching and learning in educational institutions (Motlhabane & Dichaba, 2013). There is unanimous agreement among educationists universally that for students to better understand the natural phenomena and learn how science attempts to understand and clarify issues, science teachers should afford students opportunities to engage with and fully participate in practical work (Gott & Duggan, 2009). Nevertheless, the conducting of practical science activities in schools has sparked debate among scholars regarding their specific purpose. A successful practical lesson should be inquiry based than deductive based learning (Rocard, Csermely, Lenzen & Hemmo, 2007). The argument among scholars is that the improvement of students' learning about science, may not have much bearing if practical investigations are not well prepared (Millar, 2009). In Zimbabwe, the Ministry of Education Circular No. 6 of 2001 stipulates that an Ordinary Level Biology timetable should have at least two theory periods and four practical periods per week. The Science, Innovation and Technology Policy (2012) states

that practical experiments should exploit the background experiences of students and encourage interest across gender, science subjects should be taught in a way that permits every student to undertake direct practical experimentation frequently. Nevertheless, most learners countrywide have continued to perform poorly in Biology Paper four which is a practical examination paper as compared to Paper one and two which are theory examination papers (ZIMSEC Examiners Reports, 2014). The Science, Innovation and Technology Policy (2012) states that practical experiments should exploit the background experiences of students and encourage interest across gender, science subjects should be taught in a way that permits every student to undertake direct practical experimentation frequently. Nevertheless, most learners countrywide have continued to perform poorly in Biology Paper four which is a practical examination paper as compared to Paper one and two which are theory examination papers. A study in Kenya by Rutto and Kptingel (2014) has revealed that students are less exposed to practical work during science lessons.

Cirfat (2013) observed that whatever the argument for or against the impact of practical work on students' learning outcomes in STEM subjects, it is incontrovertible that engagement of students in practical activities would make their learning more concrete and aid the development of many life-coping skills. These practical activities can only be properly handled in science laboratories since laboratory is regarded as the focal point for the study of science. A study conducted by Obiekwe and Chinwe (2012) in Nigeria on the teaching of biological concepts using the 5E (Engagement, Exploration, Explanation, Elaboration and Evaluation) model revealed that students who were exposed to the 5E method achieved better results than those whose teachers used the lecture method. Some teachers laid too much emphasis on content and the use of 'chalk and talk' approach which does not enhance the teaching and learning of Biology. This slackness and 'shy- away' attitude from activity based-approach of instructional delivery has led to abstraction, which makes the students passive and more inclined to rote memorisation (Obiekwe & Chinwe, 2012). Such teacher-centred method that puts the students as passive recipients of knowledge and the teacher as the only source of knowledge might not improve achievement or stimulate positive attitude towards Biology practical lessons (Nwagbo, 2006).

Olatunde, (2009) argues that students' attitudes about the value of learning sciences may be considered as both an input and outcome variable because their attitudes towards the subject can be related to educational achievement in ways that reinforce higher or lower performance. Considering this, students who do well on any topic generally have positive attitudes towards that subject. However, those who have negative attitudes towards an issue tend to perform poorly in the question Students' attitude toward the learning of sciences.

Akunga, Amadalo and Maiyo (2010) who found that there are gender and regional disparities in enrolment and academic achievement. Although near parity in enrolment has been realized in some regions, the North Eastern part of Kenya is grossly affected. It is characterized by general low enrolment and a serious gender disparity in enrolment. The near parity enrolment in most regions notwithstanding, the disparity in academic achievement cuts across regions and gender.

In order to reduce the disparity in performance of girl child, different groups have made different efforts. These include women professionals in Forum for African Women Educationists (FAWE) which is supporting girl child education in finances (FAWE, 2008). Provision of free and compulsory basic education strategy targets both boys and girls but it focuses mainly on the girls since it addresses the factor of direct costs, a problem that affects girls most. It has been adopted and practiced in Kenya among other countries (FAWE country profiles, 2003). The government of Kenya has undertaken a project in conjunction with the government of Japan through the Japanese International Cooperation Agency (JICA) called Strengthening Mathematics and Science in Secondary Education (SMASSE project, 2000). The programme provides in-service refresher training for teachers of Mathematics and Science where they are expected to use teaching aids in the classroom and engage learners in "hands-on" experiences in the course of teaching-learning process.

SMASE–WECSA Association in Western, Eastern, Central and Southern Africa was borne out of a regional conference held in Nairobi–Kenya hosted by SMASSE–Kenya in February 2001. This was out of the recognition that challenges in the teaching and learning of mathematics and science cuts across curricula in African continent. In an effort to realize our objective of Improving Classroom Activities for Quality Teaching and Learning of Mathematics and Science in Africa through Pre-service and In-service Education Training (INSET), research, exchange of information seminars and conferences, joint activities and all other lawful means, CEMASTEA-Centre for Capacity Development and member countries have been challenged.

The ASEI-PDSI approach is an acronym for Activity, Student, Experiment, and Improvisation (ASEI) and Plan, Do See and Improve (PDSI). The approach endeavors to shift teaching and learning from knowledge-based teaching to activity-based teaching; teacher-centered teaching to student-centered learning; chalk and talk to experiment and improvisation. ASEI-PDSI approach equips teachers for effective classroom practices, believing that the battle against poor performance in Mathematics and the Science must be won in the classroom. ASEI-PDSI is based on the premise that learners learn better when they are involved in the doing, through discussions, experiments and other activities, hence the emphasis on the learners as the central focus of learning. This is in recognition of the fact that for a long time teaching in schools has predominantly been traditional where the teacher has been the centre of the learning process while current trends in education advocate for a learner centred teaching learning approach. Through INSET activities, teachers have been empowered with skills to develop innovative lessons through group planning, peer teaching, peer review and classroom practice in schools. The overall goal is to improve the capability of learners in mathematics and science education primarily focusing on learning outcomes in mathematics and science. Through TCTP course at CEMASTEA, over 1,000 educators from SMASE WECSA member countries have been trained on ASEI-PDSI approach which they are adapting in INSET activities in their home countries.

Hand book on management of district SMASSE programmes. Hence the demand and need to reverse the trend through teachers' INSET. The emphasis on quality education is aimed at nurturing and developing students' knowledge and skills in mathematics and sciences towards this end. Teachers of these subjects are therefore targeted so that they deliver lessons with the suitable approaches and methodologies that would translate into upgrading young Kenyans capability in mathematics and sciences. Further, Student-centered learning is a pedagogical paradigm shift that is currently attracting immense attention. The situational findings indicate weak practices of ASEI –PDSI in the class room. The (MOE) and JICA agreed to continue supporting the secondary programme focusing on strengthening the practice of ASEI –PDSI at class room level. This is through understanding that the teachers have already gained meaningful teaching skills through the ASEI/PDSI and what is remaining now is to enhance these skills in the classroom and this can be done very effectively through lesson study (CEMASTEA, 2009).

UNESCO, (2011) noted that the performance of girls in science subjects in Kenyan schools has been a persistent problem. Several factors contribute to the low participation and performance of girls and women in science and technology education and science-based activities in Kenya and their lack of motivation for learning science and technology. These include a lack of relevant policies, inadequate curriculum content and delivery, and negative socio-cultural attitudes and practices. Therefore, the achievement of gender parity in science and technology should rely on an appropriate mix of strategies based on lessons learned from best practices and experiences at national, regional, and international levels. More boys than girls tend to opt for scientific and technological subjects in schools. Their performance in these subjects is better compared to girls. After school, boys more than girls, tend to pursue careers in the field of science and technology. This is a worldwide phenomenon, common to a variety of educational systems, and hence is a much-researched phenomenon. There is evidence that where research recommendations are reflected in practice, the disparities can be reduced.

Studies by Orora, 2014; and UNICEF, 2003 to find out whether there were gender differences in examination achievement when students were exposed to cooperative e-learning teaching strategy; analysis of Biology Achievement Test mean scores indicated that boys and girls were not at the same level of achievement at the start of the treatment. Boys had significantly higher mean achievement scores compared to that of girls. This creates the need to investigate the differences in performance in biology, in terms of gender among those students taught in their preferred learning styles, from those taught without considering their learning styles. Additionally, in Kenya, in spite of the various inputs to education by the government as well as international organizations, girls still lag behind at all levels of education. Table 1 shows the overall KCSE percentage average and mean score in biology by gender (2014-2019)

Table 1 Shows the Overall KCSE Percentage Average and Mean Score in Biology by Gender (2014-2019)

Year	2014	2015	2016	2017	2018	2019
Average Mean Score	27.15	29.19	32.44	26.21	22.65	23.46

Boys Mean Score						
	16.26	15.72	18.65	14.57	13.59	13.36
Girls Mean Score						
	10.89	13.72	13.79	11.64	09.06	10.10

Source: Kenya National Examination Council (2014 -2019)

It was noted in Table that average mean score for the years 2014 -2019 is far below average i.e 2014, 2015, 2016, 2017, 2018 and 2019 respectively. The general trend for girls' mean score is lower than boys' mean score. In Biology Examination Reports of years 2014 to 2019 by Kenya National Examination Council (KNEC) on candidates' responses across the three Biology papers out of 84 difficulty items, 21(25%) indicated common use of wrong spelling of biological terms, 14(16.66%) incorrect use of biological terms, and 14(16.66%) inadequate application of practical skills. A higher percentage, 35(41.67%) indicated inadequate knowledge of the subject content (KNEC, 2014, 2015, 2017, 2017, 2018, 2019). An analysis of repeated difficulty areas in performance of sciences, which refers to biology in Kenyan Education System in the last few years, indicated possible teacher-learner style mismatches in their learning process. It is noted from the table that for three consecutive years, performance in biology has been on a downward trend with only a small number getting grade B and above. The trend is raising concerns that many bright students.

A girl candidate, KCSE 2019 observed that:-

"I was expecting at least a B in Biology to pursue medicine. My dream however came tumbling down when I performed poorly in the subject, scoring a D+. My overall score was a B plain at Mayori Secondary School in Embu, I blame poor grade on two biology papers which were challenging. Biology Paper 1 was very hard. The questions were tricky and required one to think beyond things they learnt in class. They were mostly application questions. In fact, the only thing I found easy to handle in that biology (paper) was the practical examination; this is not a student failure but a system failure.I'm weighing pursuing other options including financial accounting" With her chances of pursuing a medicine-related course now slim.

KNEC report 2014 in its KCSE results cited improvement in performance. In terms of gender, 5% of male candidates attained an overall mean grade of C+ and above while female candidates who got a C+ and above stood at 41 per cent. **KNEC report 2018 in its KCSE results indicated that**in the sciences (chemistry, biology and physics), boys performed better than girls. Starehe Girls Centre; third best nationally in 2019 KCSE, in biology; the school's deputy principal had this to say;

"When teaching biology, you need to elaborate to the learners what KNEC requires of them. Biology is one of the subjects that require a teacher's guidance and attention. Candidate who wanted to pursue medicine and other related courses have to look at other options like in statistics and economics. This was because of low scores in biology. The performance in the school has been dwindling for the past three years. In the past, Starehe Girls Centre has registered up to a mean of ten in biology. But in the last three years, it dropped to nine, 6.4 and 7.3. Even then, the school performed better than many other schools that barely registered a mean of six in the subject. Biology is life and is not supposed to be a difficult subject. Being a technical subject, however, students fail when they are unable to apply technical terms in answering the questions,"

KNEC report 2019 in its KCSE resultsraised concerns on girls' dismal performance in STEM subjects girls once again missed out on better performance in mathematics and science subjects. The 2019 Kenya Certificate of Secondary Education (KCSE) exam results released noted that female candidates performed well in English, Kiswahili, CRE, Home Science, Art and Design, German and Kenya Sign Language, a striking similarity to the previous years (2016, 2017). As a result of the gender gaps in performance in SMT subjects, fewer girls as compared to boys qualify to join Science and Technology related courses. This lack of sufficient knowledge on these determinants and their influence would militate against the country's aspiration to achieve the 'vision 2030' and the Millennium Development Goals (MDGs). This is because SMT subjects contribute towards Industrialization, environmental conservation, medical research, food management and improved agricultural production (Republic of Kenya, 2005; UNESCO, 2014)

A principal in one of the sub-county schools noted:

"Biology is perceived by many as simple, compared to other sciences, but the fact is it's a technical subject that requires a lot of attention and thoroughness if one has to attain a good grade. It's also worth to note that there is a totally different setting trend from 2016 that calls maximum mastery of content to handle the kind of questions presented. Unless this is done we are headed for a serious crisis.The KNEC has killed biology subject.. Additionally, Biology is practical subject but now converting Paper 3 to purely theory is making biology a theoretical subject. No wonder they are failing because of doing 3 theory papers. Just the way agriculture practical was phased out, I can see biology paper 3 being watered down.Biology should be taught from well-equipped labs. Schools should invest heavily in models and charts, amongst other resources".

The continued poor performance in K.C.S.E biology (an external examination) by the students raises a fundamental question: How effective are the instructional strategies of SMASSE project in influencing students' performance in K.C.S.E biology? The 2016 August parliament report reinforces this question: "...is the Minister aware that strengthening of Mathematics and Science in secondary schools (SMASSE) project training service has failed to meet the objective and not provide anything new to the teachers?" (Bethell, 2016). The aforementioned question asked to the Minister of Education, Science and Technology in parliament in 2016, some years after SMASSE project establishment, is a reflection of the concern on the continued poor performance in K.C.S.E biology by students in the country. It is imperative that the study attempted an overview of academic performance in biology of girl child in secondary schoolsnational examinations in Kenya: what is the way forward?

Brownell and Wenderoth (2014) noted that gender gaps in achievement and participation in multiple introductory biology classrooms. Life Sciences Education, 13, 478–492 indicates that the under-representation and under-achievement of girls in science and technology subjects is a severe inefficiency in sub-Sahara Africa, Kenya included. If more girls could be persuaded to take up science and technology subjects in schools, we would have the benefit of increased technological output with few extra inputs. When girls opt for the sciences stream, the figures show that they perform well. It does seem that girls have a less clear vision of what the goal of their studies should be. They claim that more often, boys have chosen the direction of their studies according to their personal preferences and not on the grounds of their professional future. They show themselves to be less sure of themselves when they are confronted with mathematics and other sciences. Where they are of equal ability in a class, a girl will hesitate before choosing to follow a science stream.

However, the government and school management need to make interventions to improve the situation through building and renovating laboratories, supplying equipment, chemicals and textbooks; recruiting more science teachers, establishment of Teacher resource Centers (TRC), introducing computer science and ICT Skills to both teacher and students. These factors positively contribute to learners' actually attending and remaining healthy in school and, in the case of teachers, staying in their profession. Very often school buildings fall short in these respects, and when they do, the most disadvantaged learners are often those who suffer most. (Bethell, 2016). However, performance in science and mathematics, biology being among them has been unsatisfactory for long, as reflected by Kenya National Examinations Council (KNEC) to date

Academic Performance in Biology of Girl Child and Learner Attitudes

Attitude is an individual's prevailing tendency to respond favorably or unfavorably to an object, person, or group of people, institutions, or events. An attitude determines what an individual will visualize, hear, think, or do. Opinions can be either positive values or negative prejudice (Pearson, 2014). Further, the attitude in science means the scientific approach assumed by an individual for solving problems, assessing ideas, and making decisions in the sciences. Beliefs, therefore, motivate one's interest or feeling towards studying science.

There is a direct link between students' attitudes towards science and student outcomes. Learners who have a positive attitude toward science tend to perform better in the subject. Teachers play an essential role in developing learner's competencies in the teaching process. Teachers are critical to shaping learner's attitudes towards performance in science. Teacher plays a significant role during the process of learning, which can influence students' attitudes toward science subjects, which in turn can affect students' performance. Teachers act as role models to students, whatever they appreciate, or will have a significant effect on their students (UNESCO, 2011).

In a news letter in 2005, Assistance for Development of Education in Africa (ADEA, 2005) stated that the adequate pre-service training notwithstanding, (which is just sufficient for an orientation of the teacher into the profession),

the real teacher is generally formed in the classroom. ADEA (2005) further asserts that mathematics and science education development especially at the secondary level is a prerequisite for industrial and technological development. In the past, great efforts have gone into ensuring qualified teachers and provision of equipment and materials, but in most cases science and mathematics teachers remain inadequate in most African countries. Even where they are adequate, quality of students' achievement in mathematics and sciences education is not always high. It is with this background that the attention is now drawn to what classroom practices, utilization of the available equipments and materials, and approaches and methodologies that are employed in content delivery (ADEA, 2005). This is a critical component to the answer to mathematics and science education problem (ADEA, 2005). This is the basis for the Strengthening Mathematics and Science in Secondary Education (SMASSE) project with an In-Service Education Training (INSET). Teachers remain one of the most important human resources that a country can have. This is because the efficient human capital development depends partly on the quality and effectiveness of the teachers. The quality and effectiveness of the teacher is among others a function of the talent and the training. Additionally, training of teachers is one of the most important aspects of curriculum development and implementation in any education system. Ideally training of teachers should have a pre- service and in-service component.

Teachers' positive attitudes towards male students are a reflection of the broader societal biases about the role of women on the society and the academic capacity of girls. Evidence from Cameroon, Sieraleonne, Malawi, Guinea and Rwanda indicates that both male and female teachers believe that boys are academically superior to girls (Forum for African Women Educationalists, 2003; Nasr, 2011). Teachers pay more attention to boys than girls or completely ignore girls in class. From these findings it is clear that some teachers have negative attitudes towards their female students and this may contribute towards their low academic achievements and ultimately drop out. Lack of role models Girls also lack appropriate role models in mixed secondary because they only draw role models from immediate role experienced in the home and local community. These contrast their male counterparts whose role models are drawn from many national leaders (UNICEF, 2003). This apparent disadvantage experienced by girls could be partly due to restrictions on their freedom of movement. Girls have very little leisure time for reading, exchanging ideas and playing games (UNICEF, 2003). Without role models, the process of chipping at girls' aspiration has little to counter through pedagogy at school levels. Besides, it is observed that in many countries in Sub-Saharan Africa, the participation of girls in Science subjects compared to that of boys is low.

Secondary schools offer Chemistry, Physics and Biology, sciences that offer students a ticket to courses such as engineering, medicine, aeronautics and astronomy among others. According to the 2019/2020 placement results by the Kenya Universities and Colleges Central Placement Service (KUCCPS), of the 57,687 students who enrolled for Science, Technology, Engineering and Mathematics (STEM) courses, 63 per cent were male and 37 per cent female. In the past decade, the government has been encouraging girls to take up courses on STEM. Additionally, girls cannot take up STEM courses if they are neither selecting the sciences nor performing well. He said pre-determined selection of courses, reinforced stereotypes; ill-equipped schools, poor teacher-student relations and archaic models of teaching are influencing girls' failure in sciences.Teachers should be making learning science subjects enjoyable to make it attractive to girls instead of delivering the content as if they are memorizing how they were trained in the university. He said, boys unlike girls, are freer to seek remedial intervention should they not understand the subject. A girl would struggle with the stigma of being called daft by teachers should she be consulting often.

Academic Performance in Biology of Girl Child and Cultural Factors

OECD, (2004) has shown that science is for all students regardless of their age, sex, cultural or ethical background, disabilities, aspiration or interests and motivation in science. They have shown that all have the opportunity to attain high scientific literacy. According to Organization for Economic Co-operation and Development most children come to school willing and ready to learn. Schools must therefore strengthen this predisposition by developing their altitude and skills so that the students can acquire new knowledge and skill necessary for successful adaptation to changing circumstances. The learning of science is an active process. This learning is something the students do, not something that is done for them.

Jones and Wheatley (2012) reviewing several studies undertaken in Africa concludes that there is inter-relationship between the socio-cultural and economic background of students and their academic achievements. This means that parental influence on the educational aspiration of their children varies in relation to their socio-cultural and economic status. Although the situation has to some extent changed due to the efforts made by the government and other stakeholders in sensitizing the community members on the importance of educating their girls, the Somali

community from time immemorial used to sideline the education of girls even when it comes to religious schooling. This perception has contributed to the dismal performance of girls in KCSE national examinations as there are no role models in society to show them benefits of education.

UNESCO (2011), found out that, girls remained unconfident in pursuing physics, chemistry and biology, even when they are generally doing well in the subjects. This also worsens as they progress up the academic ladder, so that, by the time they get to college, their confidence and ability to undertake science subjects is uncorrelated with the actual talent. Further, found that male students generally have a better perception towards sciences than their female counterparts who are much inclined to the biological sciences.

Numerous domestic chores that girls attend to when they go home from school have a lot of impact on their academic performance. Girls get involved in such household activities like fetching water, firewood, washing utensils, cooking and serving members of the family. In order to fulfill these roles, girls from poor households perform poorly and are the first to drop out of school. In this way they miss education and get training that could enable them to have better lives as future mothers (Forum for African Women Educationalists, 2003)

Culture determines or dictates various things in a person's life. This ranges from norms, values, beliefs, and even the economic activities of the society. Culture is transmitted from one generation to another. This means that the parents and society perception of education determine children's view about the same. Gender socialization is an obstacle to girl's equal participation in education. Through home and societal socialization, boys and girls learn gender stereotypical roles, norms, and attitudes. In most African communities, girls are brought up learning and knowing that women are not good in sciences (Chege&Sifuna, 2010). Due to this, girls acquire a negative attitude about their ability to compete at the same level as boys. Boys, on the other hand, are brought up believing they can handle any subject. Cultural beliefs, traditions, and norms in Kenya have a significant effect on girl student academic performance. In the case of day schools, girls are subjected to domestic work daily, while in the case of boarding schools, the girl student is negatively affected mostly during school holidays. Besides, the boy is given preference in a family where financial resources are scarce. In some cases, the girl student does not attend school as desired (Orodho, 2010).

Parents have distinct attitudes towards their daughters and sons. Girls are brought up for female duties such as raising children while boys have a whole working life to concentrate on career building. Parents and the community at large believe that girls lack qualities of assertiveness, initiative, and independence. Also, parents respond differently whenever things go wrong for boys and girls in academic performance. These parental attitudinal differences are due to culture (Chege&Sifuna, 2010). Girls are not encouraged to enter those academic areas that were historically dominated by boys. Most societies view a girl's education as a waste of time because they will leave home. Such cultural traditions make girls shy off from schooling and develop dependent attitudes. Culturally defined duties for girls, particularly in domestic circles, socialize girls to take the roles of deputy mothers at home.

Conclusion

The conclusions are presented along the theoretical framework that guided the study as follows: There are gender and regional disparities in biology academic achievement. Cultural practices among communities remain an obstacle to girl's low performance. Through home and societal socialization, boys and girls learn gender stereotypical roles, norms, and attitudes. In some communities, girls are brought up learning and knowing that women are not good in sciences.

Teaching of Biology is in dire need of methods with qualities such as lesson clarity, promotion of self-activity, promotion of self-development, stimulation of interest and curiosity and relying on the psychological process of teaching and learning to recommend to science teachers.

Improved buildings and renovating laboratories, supplying equipment, chemicals; recruiting more female science teachers, establishment of Teacher Resource Centers (TRC), adequacy of computer science and ICT skills positively contribute to learners' actually attending and remaining healthy in school and, in the case of teachers, staying in their profession will boost performance.

Teachers are critical to shaping learner's attitudes towards performance in biology hence plays a significant role during the process of learning, which can influence students' attitudes toward science subjects, which in turn can

affect students' performance. Learners who have a positive attitude toward biology tend to perform better in the subject.

Recommendations

In light of the conclusions about the study recommends the following:

Through INSET activities, biology teachers need to be empowered regularly with new skills to develop innovative ICT lessons through group planning, peer teaching, peer review and classroom practices and also exam setting criterion at schools level.

Day mixed schools ought to be locally distributed to maintain reasonable girl child travel to school distances; relatively small; with relatively small classes and relatively low density of classroom occupancy to maximize girl child educational benefits.

Schools should be soundly built to withstand natural disasters that provide basic services and opportunities for outside play, and have good indoor environmental quality for girl child to do physical exercises.

Provision of improved buildings and renovating laboratories, supplying equipment, chemicals; recruiting more madam science teachers, adequacy of computer science and ICT Skills to contribute to learners' actually attending and remaining healthy in school and, in the case of teachers, staying in their profession.

Teachers to change girls' attitudes towards performance in biology hence during the process of learning, which in turn can affect students' performance.

Shift from knowledge-based teaching to activity-based teaching; teacher-centered teaching to student-centered learning; chalk and talk to experiment and improvisation need to be embraced in teaching of biology.

References

1. Bethell, G., (2016) Assessment of Mathematics in sub-Sahara Africa: Status, Challenges and Opportunities (Cambridge Education, UK, 2016).
2. Chege, A., and Sifuna, D. N. (2010). Girl's and Women's Education in Kenya. UNESCO.
3. Daft L.R (2004) Organizational Theory and Design. 8th Edition U.S.A. Thomson South-Western.
4. De Broueker, P., and Underwood, K. (2010). Intergenerational education mobility: An
5. International comparison with a focus on postsecondary education. *Education Quarterly Review, 5(2), 30-45.*
6. Eddy, S. L., Brownell, S. E. and Wenderoth, M. P. (2014). Gender gaps in achievement and
7. Participation in multiple introductory biology classrooms. Life Sciences Education, 13, 478–492
8. Forum for African Women Educationalists (2003). FAWE Country Profiles. Prepared for 1st FAWE Donor Consortium Meeting.
9. Forum for African Women Educationalists (2008). FAWE: Advancing girls' education in Africa. Gender Policy in Education. Nairobi: Government Printers
10. KNEC (2014, 2015, 2016, 2017, 2018, 2019). Kenya certificate of secondary education examination report. Nairobi:
11. Kusek Z. J. and Rist C.R (2004) Ten steps to Results -Based Monitoring and Evaluation.
12. Washington DC.

13. Nasr, A. R. (2011). Attitude towards biology and its effects on student's achievement.University of Isfahan, .

14. Njuguna M.B. (2005) SMASSE: Students can excel in Maths, Science Subjects. The Principal. Second Edition pp 29-30
15. Nui N. Lelei P. Waititu M. Oduor S. Thuo J. K. Mutua and Muyanga (2006) The SMASSE Newsletter 16: pp 2-3.

16. Olatunde, Y. P. (2009). Students' attitudes towards Sciences and academic achievement in some selected secondary schools in Southwestern, Nigeria. European Journal of Scientific Research, 36: 336-341.

17. Pearson, R. (2014). Gender Analysis and Policy. Edinburgh: Routledge Publishers.

18. Republic of Kenya (2005). Sessional Paper No. 1 of 2005: A Policy Framework for Education, Training and Research. Nairobi: Government Printers.

19. Republic of Kenya (2007). Ministry of Education: Nairobi: Government Printers.

20. The World Bank. Monitoring Report from 2005 to 2011. Paris: UNESCO

21. Siocha O. N.; Onyancha O. O. (2018): Implications of Gender Parity on Quality Education Provision in Public Primary Schools in Kenya International Journal of Science and Research (IJSR)ISSN: 2319-7064; Index Copernicus Value (2016):79.57 7.296 Volume 7 Issue 8