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Access to Quality Education: Assessing Science Learning Resources in Kenyan Universities

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Abstract: Today, Kenya Government is pursuing Vision 2030. Kenya Vision 2030 is the country's new development blueprint covering the period 2008 to 2030. It aims to transform Kenya into a newly industrializing, "middle-income country aims to ensure gender equity in power and resource distribution and increase participation of women in all economic, social and political decision making process. Further more education may also contribute to raising the quality of the labour force and hence increased productivity within a lifespan. The purpose of the study was to carry out an in-depth analysis on performance of women with that of men in relation to equity to University learning resources. Second to examine alternative strategic plans for enhance university student performance in science, mathematics and technology programmes. The theory used in this study was Liberal feminism. It is rooted in the tradition of 16th- and 17th-century liberal philosophy, which focused on the ideals of equality and liberty. The research design used in this study is ex post facto. The study was carried out in 3 Kenyan public and 3 private universities. Chi-square statistical test was used to establish relationships and variable traits while themes were derived from narrative data. The findings of this study revealed that in lower levels of education tier boys outdo girls in SMTs in terms of performance. However, at university level, men and women perform equally well. Contrary to general misconception that transition of women is not at same the rate as men, the study has shown that the difference is insignificant. The study has also established that there is no correlation between gender and preference of SMT programmes at university level. Government should set aside lots of capital to equip the SMTs facilities at all the universities.
Keywords: Access, Quality Education, Assessing, Universities

INTRODUCTION

Issues of access became topical internationally in the 1960s through the work of UNESCO. Interest stemmed from *The Universal Declaration of Human Rights(1948),* particularly Article 26 which states that everyone has the right to education and calls for free and compulsory education in the elementally and fundamental stages; and for access to technical, professional and higher education. The 1981 UN *Convection on Elimination of All Forms of Discrimination against Women (CEDAW)* extends this debate further, particularly through article 10 which details areas where discrimination should be eliminated.

Kwesiga [1] observed that, access in the educational context soon leads to questions of equality of opportunity. Analysts of education of women in developing countries have grouped access factors under various headings, including socio-economic and demographic conditions; national policies; institutional factors; or household and individual background. Others have classified them as geographical, socio-cultural, health, economic, religious, legal, political/administrative and educational. However, the study further states that one of the most useful and clearest methods of categorizing access factors is through family, societal and institutional. UNESCO estimates that of the 137 million illiterate youths in the world, 63 per cent are female. The female to male ratio literacy ratio is lowest in Sub-Saharan Africa, Middle East and North Africa, and South Asia-regions that also have female disadvantages in primary and secondary enrolment. However there have been dramatic increases in the educational attainment of females that underlie the fundamental changes that have taken place in the global talent pool. Indeed, in most industrial countries, women now are attaining university degrees at a higher rate than men. This trend reverses the pattern of two generations ago, when educational attainment was considerably higher among males [2].

In Kenya, as in other African countries the proportion of females declines as females move up the education ladder. As a result, slightly less than one third of the secondary school students who secure admission to public universities are female [3]. Persistent gender imbalances at the tertiary level to education are a reflection of gender bias and structural differences in access of education. Public universities can make substantive contribution to alleviating gender imbalance by encouraging women and girls to venture into the traditionally male-dominated fields of science and technology. The first step is to find out the underlying causes of the problem, with view to devising appropriate strategies for tackling it. While gender disparities in students' enrollment exist at all levels of higher education, they are particularly wide at higher degree levels and in science, mathematics and technology-oriented subjects. Collecting information on the nature and magnitude of gender enrolment inequities in the institution and their causes including the needs of different categories of women to gain a good understanding of the problems so as to be able to devise appropriate solutions would help increase enrolment [4].

Nawe, [5] there are several factors militating against women's participation in higher learning. First since the colonial period women have been are expected to balance housekeeping and productive roles in line with the colonial policy of minimizing operational costs in subsistence economy. Second at the continental level, women are rarely seen in seminars, workshops and the like involving senior officials, where issues pertaining to higher education are discussed. Third laws and regulations may appear fair but there are salient features that need deeper consideration when dealing with questions of equity. For instance, the law may provide for equal access to education but this alone is not enough.

In addition, Chege and Sifuna, [6] observe that a number of issues have been advanced to explain the low enrolment of women in higher education. First low secondary school enrolments greatly reduce the scope and progress in higher education. Second, there is also high rigidity of admission requirements for particular degree courses which also narrow the potential pool of applicants. Third, failure rates in certain fields like medicine and engineering. Forth, higher level of sexual harassment of women students. The majority of the women decry the advantage male professor's take of them. They argued that it is not likely that a woman would complete a thesis process without some bruises. If supervisors make sexual advances and you turn them down, they could dismiss you as a weak candidate [7]. Fifth, low level of manufacturing and service activities tends to discourage parents from sending their girls for university education as they do not see prospects for absorption in the formal labour market. Finally, there are still the social-cultural factors within communities that confine women to lower levels of education system. This perception coupled with economic factors, leads some families to terminate girls education at lower levels.

According to Nawe [5], the following recommendations will help increase female access to higher education. Short-term strategies include, gender sensitization, particularly regarding senior officials, counseling for confidence building, remedial course to raise the current female enrolment, an outreach programmes where girls in Form V and VI are supported to perform well through motivational programmes, confidence building and role modeling and Form II girls should be encouraged to take science in Form three and passing in Form IV. Long-term strategies include interventions at lower levels by monetary support to promote girls' performance particularly in science subjects; role modeling was considered as a very effective way of confidence building. Gender education at all levels is considered as the best way of inculcating appropriate values. Appraisal system that is gender sensitive should be established and finally to create a friendly and secure environment.

The need to increase enrolment in medicine, pharmacy, engineering and technical based programmes cannot be overemphasized, since there remains shortage of these professionals in the country [3]. Despite both female and male under enrolment in these programmes, the case for enhancing the enrolment is more compelling. According to Mbilinyi [8], access to resources should also be mainstreamed. Mainstreaming means that power in social relations is redistributed, so that women have equal access to the same resources as men. Many actors (administrators and managers, academics, workers, students) agree, for example, with the need to increase female enrolment at undergraduate and postgraduate level, and to increase female recruitment among academic and administration staff. Women staff and students should have equal access to office, laboratory, computer and library resources, which necessitates enhanced safety from sexual harassment during night time hours.

Statement of the problem

The ratification of a number of international instruments and declarations is a tacit acknowledgement of failure of government to mainstream gender in their programmes and activities. Such instruments include, but not limited to Convection on the Elimination of All forms of discrimination against women, Kenyan universities that are predominantly science based have

females underrepresented in various faculties. For example in 2008/2009 academic year Kenyatta University which was then predominantly art had 44.99% of its student population being female while Jomo Kenyatta University of Agriculture and technology had only 31.19 % [9]. Researchers have not ventured into finding out how the few women who qualify to pursue the traditionally stereotyped 'masculine' subjects fair from point of entry to exit. Similarly despite the many efforts by various institutions to mainstream gender equal access to resources remains a pipe-dream. Yet few studies have been conducted in the area of gender and educational facilities [10]. It was on this premise that the research attempted to focus on whether men and women have equal access to learning resources in selected science, mathematics and technology programmes in Kenyan universities and its effect on access to quality education.

Objectives of the study

1. To assess gender influence on access to learning resources in science, and technology programmes in Kenyan universities.
2. To determine alternative strategies to enhance access to learning resources in science, and technology programmes in Kenyan universities.

Hypothesis of the study

Ho1: There is no significant difference between men and women in access to resources in science and technology programmes in Kenyan universities.

RESEARCH METHODOLOGY AND METHODS

The research design used in this study is retrospective ex post facto as I traced the history of subjects. The term ex post facto according to Landman [12] is used to refer to an experiment in which the researcher, rather than creating the treatment, examines the effect of a naturally occurring treatment after it has occurred. In other words, it is a study that attempts to discover the pre-existing causal conditions between groups. According to Kothari [11], the researcher has no control over variables; he can only report what has happened or what is happening. It also includes attempts by researchers to discover causes even when they cannot control variables.

The study aimed at collecting information from respondents on whether the few women students who make it to science, mathematics and technology fair well when compared with their male counterparts. This was done in three dimensions; academic performance, flow in successive years and access to facilities. The decision to use this design came about due to the fact that this study aimed at analyzing what has already occurred regarding performance. After collection of data, the researcher proceeded to measure, classify, analyze, compare and interpret them.

FINDINGS AND DISCUSSION

This section aimed at assessing whether gender influence on access to learning resources in science, and technology programmes in Kenyan universities. The Second objective was to determine alternative strategies to enhance access to learning resources in science, and technology programmes in Kenyan universities. Respondents were asked to give information relating to relationship between men and women in access to resources in science and technology programmes in Kenyan universities. They were also required to state the obstacles they encounter as they access these facilities.

Responses were summarized and subjected to analysis using Chi square statistical test. The researcher also used the Wilcoxon – Mann – Whitney Test since the three variables were not normally distributed. This test is a non-parametric analog to the independent t-test and is used when one does not assume that the dependent variable is a normally distributed interval variable (one only assume that the variable has at least ordinal). Findings were presented in Tables 1, 2, 3, 4, 5.

First it was important to establish the frequencies of access to university facilities per week and results are summarized in Table 1.

Table-1: Access to University Facilities by Gender

Facility	Gender	N	Mean Rank	Sum Rank	Z	P
Laboratory	Male Female	88 78	86.8 79.8	7638.5 6222.5	-0.961	0.337
Resource Centre	Male Female	39 37	37.71 39.34	1470.5 1455.5	-0.328	0.743
Library	Male Female	84 73	82.91 74.50	6964.5 5438.5	-1.171	0.242

The results in table 1 show that both genders accessed the above facilities equally per week since in all cases; the p value was less than the level of significance (5%). In addition, the students were asked whether both girls and boys had equal access to university facilities and the results which were analyzed

using a chi-square analysis showed that there was no significant difference (χ=0.305, p=0.581). According to Kasakye [13], there are different constraints or challenges which are gender-based that affected students from accessing and using the laboratory. These include; the male students dominating the computer laboratory, some female students being uncomfortable with the male 'laboratory attendant' as most of them refer to him, among others.

There are also general challenges such as the limited time allocated to the users, the limited number of computers which do not correspond to the students' number, the limited space which makes the opposite sex students uncomfortable, the laboratory being closed most of the time, the laboratory attendant asking for some money to offer technical support to the users, to mention but a few. Traditionally women are more careful in handling items. Majority of respondents feel that women are more cautious in handling of facilities as compared to male counterparts. This is an important factor for universities and subsequent employers and this save them substantial revenue in terms of maintenance.

Table-2: Perceptions of Lecturers on Women's Access to Facilities

Statement	**SD**	**D**	**U**	**A**	**SA**
Access to facilities by women students is fair			10%	10%	80%
Women are more careful than men in handling university facilities	10%	20%	20%	10%	40%

Eighty per cent of respondents feel that access to facilities by women is fair as shown in Table 2. In an earlier research, it was interpreted that public universities did not have satisfactory number and quality of computers for effective teaching and learning and that lack of enough physical facilities such as lecture rooms, computers, laboratories and laboratory and workshop equipment negatively affected the quality of teaching and learning in public universities [14]. Science and technology programmes are practical subjects and the longer the exposure, the greater is grasping of various concepts. Most female students claimed that the hostels were far way from library and study centers and the paths were dimly lit exposing the girls to risk of physical and sexual abuse. This makes them keep off such areas when darkness falls leaving their male counterparts with a big competitive advantage.

Table-3: Sexual harassment by gender

	Gender		Do you leave any university resource earlier than you would have otherwise preferred for fear of sexual or any other form of harassment		Total
			Yes	No	
	Male	Count	9	90	99
		% within Gender	9.1%	90.9%	100.0%
	Female	Count	25	65	90
		% within Gender	27.8%	72.2%	100.0%
Total		Count	34	155	189
		% within Gender	18.0%	82.0%	100.0%

The results in table 3 show that 27% of the sampled female students said that they leave the university resource centre earlier than they would have preferred for fear of sexual harassment while only 9.1% of the boys who do so. In addition, the results of the chi-square analysis showed that there was a significant relationship between the gender and leaving the university resource centre for fear of sexual harassment (χ=11.2, p=0.001). Although access to facilities is the same, the males have longer periods to make use of facilities than their female counterparts.

It was important to collect students' perceptions towards access to facilities results of which are summarized in Table 4.

Table-4: Perceptions towards Access to Facilities

	Gender	N	Mean Rank	Sum of Ranks	Z	P
Access to university facilities for men and women is at the same rate	Male	99	102.78	10175.50	**-2.08****	**0.037**
	Female	91	87.58	7969.50		
Sexual harassment by male counterparts is rampant at university	Male	98	88.06	8629.50	-1.630	0.103
	Female	89	100.54	8948.50		
Women should be isolated from men when pursuing SMTs programmes	Male	98	92.87	9101.50	-0.524	0.600
	Female	90	96.27	8664.50		
SMTs facilities especially in university laboratories are too few and we always share	Male	97	93.21	9041.00	-0.082	0.935
	Female	89	93.82	8350.00		

**significant at 0.05 level of significance

Table 4 is a good illustration indicating how women are disadvantaged when it comes to access to facilities. 9.1 percent of males leave the facilities earlier than anticipated as compared to 27.8 percent of females. This amounts to higher level of sexual harassment of women students. The majority of the women decry the advantage male professors' take of them. They argued that it is not likely that a woman would complete a thesis process without some bruises. If supervisors make sexual advances and you turn them down, they could dismiss you as a weak candidate [7].

The results showed that there was a significant relationship between gender and access to university facilities (Z=-2.08, p=0.037) with men having better access than female. Once enrolled in universities, female students encounter more difficulties than males in other ways such as inadequate accommodation, poor sanitary facilities, inadequate security and sexual harassment. Moreover, inadequate funding to pay for tuition fees and subsistence has meant that women devise survival tactics which may not be acceptable to society. Some students have turned to prostitution or to relationships with men who are working, to meet their day-to-day needs. These relationships make them vulnerable to HIV and AIDS infections. Society is quick to condemn their behaviour without understanding the root cause of their problems. All these features indicate that universities do not have a conductive atmosphere for women students [15]. Again, majority of respondents are in consensus that access to facilities is not the same for both genders. Society has a general belief that sciences are male subjects

For a long time, particularly in Africa Sciences have been perceived as male subjects Analysis of satisfaction level with laboratory equipment was made. It was found that public universities did not have up-to-date laboratory and workshop equipment as the satisfaction level was 79.167% and 34.70% for private and public universities respectively. The interpretation was that public universities did not have satisfactory laboratory and workshop equipment for effective teaching and learning [14].

When it comes to sexual harassment by Male counterparts at universities P value of .103 is not significant which does affirming the general belief that females are sexually harassed by their colleagues and lecturers. Lecturers' analysis showed that 26.846% and 27.692% of students in public and private universities respectively used sex to obtain undeserved grades and that sex was a more popular tool in the hands of students than money to influence the grades obtained [14].

On isolation of men and women pursuing SMT programmes P Value of 0.6 was not significant and this means majority of respondents suggest that for women to improve in performance and enrolments, then they need not be separated from male counterparts. No public university is single sexed. Though women reside in separate hostels, they use same facilities for learning. This may be impractical given that the women are being prepared for outside world where it would be impossible to live in isolation.

On scarcity of facilities in university laboratories, P value (0.935) is not significant which imply that there was a general agreement that there is scarcity for SMTs facilities in University Laboratories. Because of the popularity of self-sponsored programmes, the growth of student numbers is not commensurate with provision of facilities. Again science facilities are expensive and any purchase would probably reduce the income to the universities. Consequently, the science students have continued to suffer as they share meager resources. Women continue

to be disadvantaged as they can only spend limited time in the laboratories on biasness the p value is .001 and this is significant meaning the perception of male lecturers towards female students is equally the same with the female students. Though male lecturers have been accused of sexually harassing the young female students, in academic matters they have not been biased and any poor performance is possible because of other factors.

On learning atmosphere the P value is .792 and this is statically insignificant. This means learning atmosphere for female students is equally the same with their male counterparts. According to Nawe, [5] laws and regulations in universities appear fair but there are salient features that need deeper consideration when dealing with questions of equity. Women because of their reproductive role may be unable to take advantage of opportunities that only come their way once in a while. Again, now that students are housed in places at times many kilometers away it makes women more disadvantaged as they leave the resource facilities early for fear of attacks.

CONCLUSION

The results showed that there was a significant relationship between gender and access to university facilities with men having better access than female. Once enrolled in universities, female students encounter more difficulties than males in other ways such as inadequate accommodation, poor sanitary facilities, inadequate security and sexual harassment. We therefore reject the hypothesis that access to facilities of male and female students is the same. Sexual harassment by lecturers and fellow students continues to be a major factor affecting women students at the universities. This inhibits adequate access to university facilities by female students by making them leave earlier than they have otherwise done. Coupled with this factor is the insecurity as the facilities are located in faraway place from halls of residence and the pavements or streets leading to them are dimly or not lit at all. It means access to facilities is not at the same rate with male counterparts. However, there is no other cited interference. Universities' facilities were also found to be inadequate. P value (0.935) is not significant which imply that there was a general agreement that there is scarcity for SMTs facilities in University Laboratories.

POLICY IMPLICATION

Policy makers also need to work with university management on Facilities near women's halls of residence should be provided so that women can access them at any time of their convenience like the male counterparts. Special scholarship programmes tailored to women should be provided. Lack of funding has hampered many girls from access higher education. Finally increase already existing infrastructure so that both men and women need not share as one sex is likely to have advantage over the other. Given the fact that there should be equal representation of both sexes at all levels, female applicants have to be given special and fair selection in relation to their male counterparts. This should be done especially in the sciences, mathematics, and technology-oriented subjects where gender disparities have often been observed.

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