The Relationship between Classroom Equipment and Students' Academic Achievement in Public Day Secondary Schools

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Abstract:-**The study was set to establish the relationship between classroom equipment and students' academic achievement in Public day secondary schools in Kisii County, Kenya. The study was triggered by the fact that most of the secondary school students' life in public day secondary schools is spent in classrooms. Classrooms therefore play a very vital role in students' life in school. The main objective of the study was to establish the level of availability and utilization of classroom equipment and its relationship on students' academic achievement in public day secondary schools in Kisii County. The production function model of education guided the study. The type of classroom equipment under study included; chalk and duster, chalk board/whiteboard, students' chairs, teachers' desks, classroom overhead projector, cupboards, wall notice, computer work station and teaching aid displays. The study adopted a correlational research design which involved students and teachers from the 246 public day secondary schools in Kisii County. The sample size of this study was selected using non-proportionate sampling, systematic random sampling and purposive sampling techniques. The Yamane simplified formula was used to calculate the sample size of 426 subjects. Data collection was done by use of student questionnaire (SQ) and Teachers Interview Schedule (TIS). The data collected were both quantitative and qualitative. Quantitative data were analyzed using inferential statistics, Pearson's Product Moment Correlational Coefficient analysis and multiple regression. Qualitative data were analyzed thematically and were reported as direct quotations. The finding of the study showed that there was a statistically significant positive correlation (r=.144, n=377, p=.005) between availability and utilization of classroom equipment and student's academic achievement, with a high level of availability and utilization associated to improved academic achievement among the students and vice-versa.**

Key Words: **Classroom Equipment, Academic Achievement, Public Day Secondary Schools.**

I. INTRODUCTION

Research studies on the classroom environment have revealed that physical arrangement plays an important role in the teaching and learning process. Classroom environment encompasses such things as; the general classroom condition, classroom space and the classroom equipment. Classroom environment can affect the performance of both teachers and students. The learning setting comprises of different components such as; learners, teachers and the physical environment (Lippman, 2010). Physical classroom environment refers to the physical room in which teacher and learners are the main element including its spatial elements like, floor, windows, walls as well as other classroom equipment like; desks, chairs, rugs, chalkboards, tack boards, easels, counters and computer equipment but not limited to these things (Fisher, 2008). Classroom environment has an effect on students' ability to learn and perform in examinations. Schools with comfortable classrooms, enhance their students' academic performance which is not likely to take place in schools with uncomfortable classrooms. Unconducive classroom environment affects students' morale and can also discourage and make them unwilling to learn.

A study by Afework (2014), on classroom conditions and students' academic performance, revealed that schools with poor classroom conditions had low students' academic performance with a mean value of 2.16 which was below average. Most schools had overcrowded classrooms which made it difficult for students and teachers to organize group work. Classrooms were congested and the equipment in them such as desks, tables and chairs were of poor quality. At the same time, students' attention was easly distracted from the outside because classrooms had broken doors and windows. The study also found out that there were teaching centres in all the schools under study. These teaching centres were used for preparing teaching aids to be used during the teaching and learning process. Although there were teaching centres in all the sampled schools, the rooms were congested which made it difficult to prepare the materials. The study recommended an urgent provision of classroom facilities such as; desks, chairs, tables, doors, windows and expansion of classrooms.

Hussain et al. (2012), in a study done in Pakistan underscored that, there was lack of physical facilities in educational institutions which resulted to the poor day-to-day running of these institutions. This state of poor and insufficient classroom facilities affect the overall performance of the institutions while adequate classroom facilities promote students' academic achievement and enhance a strong overall institutional performance. The study reiterates that, the poor state of school facilities such as; unattractive and old school buildings, cracked classroom walls and floors, lack of furniture, toilets, transport facility, proper security system, drinking water, power supply, playgrounds, teaching staff,

first aid facility, educational technology, sufficient and overcrowded classrooms negatively affect academic achievement of the school. The study therefore concludes that, availability of educational facilities has a strong positive relationship with students' academic achievement (Hussain, et al. 2012).

Suleman and Hussain (2014), points out that, proper arrangement of classroom environment leads to a favourable learning atmosphere which is key to effective teaching and learning process. Students' academic achievement is significantly affected by the quality of the physical classroom setting. Physical classroom facilities such as desks, chairs, tables, chalk and chalkboards enhance effective and successful teaching and learning. It is not possible to have effective and fruitful teaching learning process without these facilities. Students benefit more from their teachers in well-equipped and conducive classrooms and this leads to better academic performance. On the other hand, if students are taught in unconducive, uncomfortable unfavourable classrooms, they will fail to get more information from their teachers which leads to low academic achievement.

Key to the teaching and learning process is instructional technology since it makes the process more successful, interesting and fruitful. Therefore it is of great importance to impress instructional technology in classrooms so as to ensure an effective and conducive environment for the teaching and learning process. Iqbal (2005), on classroom equipment and students' academic performance, pointed out that the arrangement of classroom educational equipment and instructional spaces need to be selected for learning rather than teaching. At the same time, selection of classroom equipment should ensure a conducive and quality atmosphere which can promote quality learning. Classroom environment comprises of audio visual aids such as; charts, graphs, maps, globes, radio, mock up, multimedia, computers, overhead projectors and the internet. However, there is inadequate utilization of these technologies in the teaching and learning process since classroom organisation and unconducive learning environment does not support them (Suleman et al., 2011).

According to Suleman et al. (2011), most of the developing countries particularly Pakistan, do not effectively utilize educational technologies during the instructional process. This inadequate utilization of instructional materials in these countries is contributed by; unqualified or untrained teachers to utilize educational technologies effectively, inadequacy and low quality of educational technologies in schools (Suleman et al., 2011). Classrooms should therefore be designed in such a way that technology may be used effectively. To achieve this, classrooms should be equipped with modern technologies to ensure a favourable and conducive teaching and learning atmosphere. Training of teachers on utilization of technology should also be done as it plays an important role in the classroom physical setting. Whereas this study tackled modern technologies such as computers and overhead projectors as studied by Suleman et al. (2012), as classroom equipment, the current study was limited to the most basic classroom equipment such as chairs, desks, chalkboard, dusters which are common in most of the public day secondary schools in Kisii County, Kenya.

According to Omodara and Bandele (2010), classroom equipment are vital in the teaching and learning process especially when dealing with science activities. The activities typical of science classroom lessons include manipulating equipment and materials, writing or drawing on the board or in students note book and asking and answering questions. Other activities include; explaining or presenting facts, reflecting on scientific concepts, giving and following instructions or giving direction on experimental procedures on how to carry out an activity or exercise, listening or observing, relating with colleagues among others (Omodara and Bandele, 2010).

The academic concepts are made known to the students by the teachers within the classroom. Teachers have the main duty of completing the subject syllabus. Therefore, it is vital that the classroom environment should be disciplined, and well-ordered. It is vital for the teachers and the students to implement the traits of morality and ethics within the classroom. At the same time, they should promote a mutual understanding, amiability and co-operation amongst themselves. The efficiency in the management of the classroom and all the equipment within it, introduces a well-organized and efficient management of the lesson plans, instructional strategies, teaching-learning processes and so forth (Kudari, 2016).

Effective teaching and learning cannot take place in poorly managed classrooms with inadequate classroom equipment. There is need therefore to make classroom equipment available in schools so as to facilitate the teaching and learning process (Jones & Jones, 2012). These sentiments are supported by Van der Wal &Torenbeek (2011), who argue that effective classroom management strategies support and facilitate effective teaching and learning. Effective classroom management is generally based on the principle of establishing a positive classroom environment encompassing effective utilization of classroom resources and effective teacher-student relationships.

In a research done in West Africa, on the relationship between teaching and learning resources in the classroom and students' academic performance in the West Africa school certificate examination, Momoh (2010) concludes that proper utilization of classroom equipment significantly influence students' achievement. In this research he calculated teaching and learning resources with students' academic achievements in ten subjects. The study showed that there was a significant relationship between resources employed in teaching and academic achievement of students.

Reyes, Brackett, Rivers, White and Salovey (2012) also researched on aspects of classroom emotional climate, student

engagement, and academic achievement. The researchers suggest that high-quality student-teacher relationships coupled with emotionally supportive classroom environments, promote engagement and learning. In order to test their hypothesis, they collected data from 1,399 fifth and sixth grade students via classroom observations, student reports, and report cards. Their results indicated direct and indirect links between classroom emotional climate and academic performance and student engagement mediated the relationship between both measures. Specifically, a higher level of classroom emotional climate in the classroom was related to higher grades, and a higher level of classroom emotional climate was related to higher levels of student engagement. According to the researchers, these results imply that when teachers demonstrate sensitivity and respond to students' emotional and social needs, they are more likely to be engaged in their learning, feel connected to the teacher, and obtain higher grades. In contrast, students in emotionally unsupportive classroom environments feel disconnected from their teacher, disengaged in their learning, and their performance suffers (Reyes et al., 2012).

The Ministry of Education Science and Technology, MOEST (2010) explains the importance of ensuring that there are adequate and appropriate facilities for teaching and learning so that educational programmes could be implemented effectively. The adequacy of teaching and learning resources determines the success or failure of the educational system. According to Adan (2011), at the time of this study, most schools in Wajir District were in dire need of classroom equipment such as desks, chairs and tables. This had become a challenge to head teachers in implementing the free day secondary education program in the district. The study also reported that, the only available teaching and learning resources were textbooks. It therefore recommended more resources to be directed to the provision of the lacking classroom equipment. Priority areas that were identified for urgent attention were; the physical classrooms, toilets, desks, tables, chairs, repairing and fixing doors and windows in the already available classrooms. Although the study by Adan (2011) disagrees with availability and adequacy of other school facilities such as classrooms, toilets chairs and laboratories, it concurs with this study on availability and adequacy of textbooks.

II. METHODOLOGY

The study adopted an Ex post facto research method. According to Cohen et al (2003), Ex post facto research method is a method of teasing out possible antecedents of events that have happened and cannot, therefore, be manipulated by the investigator. This method is a systematic empirical inquiry in which the researcher does not have direct control of the independent variables because their manifestations have already occurred. The study was trying to establish how availability and utilization of classroom equipment relate to students' academic achievement. The variables had already occurred and could not be manipulated; the correlation coefficient was used to tell us effectively how availability and utilization of school resources relate to students' academic achievement. Therefore, the most appropriate research design for this study was a correlational research design.

III. RESULTS

The Level of Availability and Utilization of Classroom Equipment

The level of availability and utilization of classroom equipment among the selected secondary schools was evaluated through the use of rating scale questionnaire, which aided the student respondents to rate the availability and utilization of the classroom equipment in their schools. Using the rating on a five point scale ranging from very highly (5) to very low available (1) and from very highly (5) to very lowly (1) utilized. Table 4.16 presents the findings on availability and utilization of classroom equipment summarized in mean and standard deviation.

Table 1: Availability and Utilization of Classroom Equipment

Equipment	Availability		Utilization		Overall	
	Mean	SD	Mean	SD	Mean	SD
Chalk and duster	4.15	0.82	4.14	0.83	4.15	0.83
Chalk board/White board	4.64	0.48	4.64	0.50	4.64	0.49
Students Chairs	4.26	0.89	4.29	0.86	4.28	0.88
Teachers' desk and equipment	4.17	0.87	4.24	0.81	4.21	0.84
Student lockers/desks	4.24	0.81	4.30	0.76	4.27	0.79
Classroom projector	1.70	0.46	1.84	0.61	1.77	0.54
Cupboards for keeping books	2.34	1.06	2.49	1.11	2.42	1.09
Wall notice board/tack boards	3.20	1.25	3.27	1.25	3.24	1.25
Computer work stations	2.16	1.05	2.25	1.10	2.21	1.08
Teaching aid displays	2.34	1.06	2.48	1.12	2.41	1.09
Mean average	3.32	0.38	3.50	0.41	3.45	0.40

Source: Survey data (2018)

On the availability and utilization of classroom equipment, the results of the survey show that there is a moderate index on availability and utilization. This was reflected by an overall mean rating of 3.45 (SD=0.40) on the availability and utilization score in the scale of 1 to 5. Classrooms should be equipped with relevant and appropriate equipment to ensure a favourable and conducive atmosphere for teaching learning process. From this rating it's clear that most of the classrooms

in day secondary schools in Kisii County lack appropriate and adequate classroom equipment.

It emerged from the results of the survey that, on average the utilization index of the classroom equipment by the students is relatively higher (mean=3.45 and a standard deviation=0.40) than the availability index. Whereas availability index of classroom equipment was rated at 66.4%, the use of the same classroom equipment was rated at 70.0%, indicating that there is some stress on some of the few available classroom equipment. This could be attributed to the ever increasing student population occasioned by the implementation of Free Day Secondary Education and the spirited effort by the government to improve transition from primary to secondary schools.

On availability and utilization of individual classroom equipment, the results of the survey established that chalk board/white boards, student chairs and student lockers and desks are the most readily available and highly utilized classroom equipment. This was concluded from their ratings of 4.64 (SD=0.48), 4.26 (SD=0.89) and 4.24 (SD=0.81) respectively on the scale of 1 to 5. On the other hand, classroom overhead projector and computer workstations are some of the least available and equally underutilized classroom equipment in most of the day secondary schools in Kisii County, as reflected by the ratings.

Relationship between Classroom Equipment and Student Academic Achievement

$H_0$4: *There is no significant relationship between availability of classroom equipment and students' academic achievement in public day secondary schools in Kisii County*

To investigate whether there was any statistical significant relationship between availability and utilization of classroom equipment and student's academic achievement, the null hypothesis was tested using Pearson Product Moment Correlation Coefficient analysis. The scores on availability and utilization of classroom equipment was used as the independent variable and student's academic achievement used as dependent variable. The level of availability and utilization of classroom equipment was computed from frequency of responses and converted into a continuous scale. High scale ratings implied a high perceived level of availability and utilization of classroom equipment and vice-versa. Student's academic achievement for each respondent was obtained from a common exams administered to them. The significant level (p-value) was set at .05. If the p-value established was less than 0.05, the null hypothesis would be rejected and a conclusion reached that a significant difference does exist. If the p-value was larger than 0.05, it would be concluded that a significant difference does not exists. Table 2 shows the correlation analysis results in SPSS output.

Table 2: Relationship between Availability and Utilization of Classroom Equipment and Student's Academic Achievement

		Classroom Equipment Availability & Utilization	Academic Achievement
Classroom Equipment Availability & Utilization	Pearson Correlation	1	.144**
	Sig. (2-tailed)		.005
	N	377	377
Academic Achievement	Pearson Correlation	.144**	1
	Sig. (2-tailed)	.005	
	N	377	377

**. Correlation is significant at the 0.01 level (2-tailed).

The finding of the study shows that there was a statistically significant positive correlation (r=.144, n=377, p=.005) between availability and utilization of classroom equipment and student's academic achievement, with a high level of availability and utilization associated to improved academic achievement among the students and vice-versa. Given that the relationship was statistically significant, the hypothesis that, "*there is no statistically significant relationship availability and utilization of classroom equipment and student's academic achievement*" was rejected. Therefore, it was concluded that there is statistically significant positive relationship between availability and utilization of classroom equipment and student's academic achievement.

However, to estimate the level of influence of availability and utilization of classroom equipment on student's academic achievement, a coefficient of determination was computed using regression analysis and the result was as shown in Table 3.

Table 3: Model Summary on Regression Analysis of Influence of Availability and Utilization of Classroom Equipment on Student's Academic Achievement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.144[a]	.021	.018	10.2701

a. Predictors: (Constant), Classroom Equipment Availability & Utilization

The model summary reveals that the level of availability and utilization of classroom equipment accounted for 2.1 % (R Square =.021) of the variation in students' academic achievement. This finding suggests that variation in the level of availability and utilization of classroom equipment explains 2.1% of the variability in students' academic achievement. This infers that other factors not studied in this research contribute to 97.9% of students' academic achievement in the county. This therefore means that there are other factors other than availability and utilization of laboratory equipment that contribute to students' academic achievement in the county. The fact that the findings on the relationship between availability and utilization of classroom equipment reveal a

significant positive relationship with students' academic achievement, the current study concludes that there is a positive relationship between availability and utilization of classroom equipment in public day secondary schools in Kisii County.

The findings above can be said to be in agreement with Suleman and Husian (2014), who carried out a study to examine the effects of classroom physical environment on the academic achievement scores of secondary school students in Kohat Division, Pakistan. The study was experimental in nature reason as to why Pretest-Post-test Equivalent Group Design was used. Two different classrooms were used one experimental group and the other controlled group. In the experimental group there was proper arrangement of desks, tables and chairs for the students and teachers. The other classroom equipment availed for this group were; overhead projectors, white boards, well painted walls, proper lighting and ventilation and classrooms were spacious. This was the opposite in the controlled group but usual method of teaching was used in the two different classes. At the end of the experiment period, the results showed that there was a significant difference in mean scores betwwen the experimental and controlled group on the post-test. This is a clear indication that students who attend well-equipped classrooms performed better than those who attende ill-equiped classrooms.

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