



## Effects of Learning Environment on Public Secondary School Students' Academic Achievements in Marakwet East Sub-County, Kenya

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**Abstract:** *This study investigated the reasons behind the smaller number of students transiting from secondary school level of education to tertiary and university institutions in Marakwet East Sub-County. This was in response to concerns raised by education stakeholders in the area. The research focused on the effects of learning environments on secondary school students' academic achievement in the Sub-County. The study was guided by the following research questions; what learning environment exists in public secondary schools in Marakwet East Sub-County? What is the level of academic achievement of public secondary schools in Marakwet East Sub-County? The study was anchored on Socio cultural Learning Theory of cognitive development by Lev Vygotsky (1978). The study aimed at establishing the effects of learning environment on students' academic achievement at the end of four years in high school. It adopted an embedded mixed methods research design that employed causal comparative for quantitative and ethnographic for qualitative research approaches. The study examined 18 public secondary schools, 18 Directors of Studies and 140 government employed secondary school teachers who teach within Marakwet East Sub-County. The study used stratified and simple random sampling to select a sample of 10 directors of studies, 10 secondary schools and 103 secondary school teachers. Data were collected through administering questionnaires to teachers, interviewing Directors of Studies, observation, and carrying out document analysis. Collected data were analyzed using descriptive and inferential statistics. The collected quantitative data were analyzed using ANOVA and t -test. Qualitative data were analyzed through thematic and in-depth descriptions of observed and recorded data. Frequency tables were used to present the analyzed data. The study found physical, social and teaching learning school environments affected students' academic achievement. The study findings recommended for funding of secondary schools by government and other education stakeholders. This will facilitate schools' improvement of the physical environments and procuring of teaching learning resources. It also recommended for in-service training for the teachers to acquire knowledge, managerial skills, and attitudes and resources for enhanced management of human, physical resources and improvement of students' academic achievements.*

**Keywords:** *Effects, Learning Environment, Academic, Achievement, Public, Secondary School.*

### 1. INTRODUCTION

Various scholars have defined learning environment using different studies and styles. According to Oduwaye (2011) learning environment denotes the context in which learning takes place and encompasses all resources, human and material, programmes and opportunities for students to use them (resources) creatively and imaginatively while learning and to develop their potentials. Cohen (2015) in his view and opinion said that learning environment is the quality and character of school life that entails the many varied patterns of school life experiences that reflects on norms, values, goals, teaching, learning, interpersonal relationships, leadership practices and school's organizational structures in general. According to Nwadiani (2010), learning environment is an important concept that keeps evolving and that over time, concepts/environments changes from simple to become even more complex in structure and form. Therefore (changes) greatly influencing the individual's ways of acquiring skills, knowledge, attitudes and competencies. From these definitions (Oduwaye, 2011; Cohen, 2016; Nwadiani,2011), the study can broadly examine the concept of learning environment as a setting in which the learners comes into contact with, thereby influencing his or her behaviour as a whole.

It is important to note that the learning environment under study is that of secondary schools. According to Rohana (2009), Secondary school is a formal organization where teachers and students' activities are planned, organized and controlled both internally and externally. To him a secondary school is a formal learning environment which is influenced physically from within and also from without. This means a secondary school learning environment comprises of physical, academic, social and cultural environments.

In the global arena, for example in Kuwait, Al-Enezi (2002) carried out a study on the relationship between school building conditions and academic achievement of 12<sup>th</sup> grade students in Kuwait public schools. The study revealed that school environments require being suitable ones. The study also recommended for school environments to be made positive and suitable to satisfy students' life as well as promoting democratic society. Samani (2011, p. 133), had conducted a study on the impacts of lighting quality on students' learning success in the classrooms in Malaysia's multimedia university faculty of creative Alfa course. The study found that improving lighting in the learning environments was critical for increasing students' desire to learn more. The study investigated the important aspects of education and the learning environment which was found to have profound effects on secondary students' academic achievement. This study showed that lighting is an important requirement in every learning environment as it affected students' learning and outcomes.

In the United Kingdom (UK) Argyropoulos (2019, p.3) did a study that investigated the impact of school physical environment in the provision of quality secondary school education in the United Kingdom. The study revealed that most classrooms in the UK schools lacked decency. The schools also lacked adequate space, ventilations and heat insulation. This study also reported that urinals and incinerators were inconveniently located, making the schools' plant be in poor conditions. These numerous shortcomings created significant gaps in the consistency of the learning environments, resulting in non-attainment of goals and expectations of public secondary schools. The study had highlighted many adverse effects of physical environment in the provision of quality education in the UK. Therefore, the shortcomings had translated to secondary students' underachievement. This study revealed the status of public schools' physical learning environment in the UK to be in dilapidated situations. In other words, majority of the schools were inadequately equipped to provide quality education to the UK secondary school students. Although UK is a developed world, the study findings have revealed that the public school physical learning environment was in bad state and required stakeholder attention.

Another study conducted in Brazil by DiGropello (2014), is an experimental research study on the impact of the physical environment on students' achievement in public secondary schools in Brazil, which compared urban to rural secondary schools' physical environment. The study used an experimental research design. According to the study, Brazilian schools had insufficient funding, poorly trained teachers, rigid pedagogies and overly regulated school management. The inadequate funding had hampered the construction of physical infrastructure. The study had also revealed that secondary schools in rural Brazil were poorly furnished to cater for the educational needs of the students compared to the secondary schools in the urban setting. The poor physical infrastructures were evident in the poorly light and poorly ventilated classrooms that had cracked walls and floors. This made both students' and teachers' concentration in classes very low. The poor physical environment had demotivated the teachers who were working under pressing environments. All these contributed to lower student academic achievement. The scenario in Brazil agrees with observations made by Kodhek (2019), in Kenya who wrote that students in some scenes in Kenya learnt under trees or inside muddy walls and temporary classrooms.

Similarly, in a study done in Pakistan by Javed and Asghar (2017), on Association of Classroom Environment with Academic Achievement of Secondary School Girls in Pakistan found that there was a positive association between the classroom environment and academic achievement of girls at secondary school level. The study also revealed that positive classroom environments are those with adequate physical facilities that support the teaching learning processes. The availability of adequate facilities would make academic achievement of girls at secondary school level productive. Classroom environments with existence of requisite resources and modern instructional facilities for teaching and learning process make the learning conducive. The positive effect of classroom environment on

academic achievement was found in small, medium as well as in large category schools. This concurs with findings and proposal by a study in Kuwait (Al-Enezi, 2002), whose findings proposed that school environments should be made conducive and accommodative to satisfy students' academic and social needs. The study had investigated the relationship between school building conditions and academic achievement of 12<sup>th</sup> grade students in Kuwaiti public schools. The study found that school environments needs to be suitable ones. Based on these findings the study recommended to stakeholders like teachers, school managers and education officials to ensure school learning environments were positive and suitable for students' satisfaction. This would ensure there is good school life that would later translate to, and promote democratic society.

Studies that were conducted in the African region included that by Bogonko (2002), which had observed that physical learning environment conditions in Africa differed significantly. In Nigeria, for example, Oduwaye (2011) observed that learning environment denoted the context in which learning took place and which encompassed all resources that included human and material, programmes and opportunities for use by the students. This means the resources students apply creatively and imaginatively while learning as well as in developing their potentials to the fullest. Adamu (2015), also in Nigeria conducted a study on influence of learning environment on students' academic achievement in Mathematics in selected secondary schools in Yobe state in Nigeria. His study showed that learning environment significantly affected students' academic scores and grades and concurred with Nwadiani (2010) study that observed that under certain conditions an individual learner acquired new skills, gained knowledge and developed appropriate competencies and influences. Other opinions of similar thoughts included Cohen's (2006) who wrote that learning environment referred to the quality and character of school life and varied patterns of school life experiences such as norms, goals, values, interpersonal relationships, teaching, learning and leadership practices, and organizational structures. These reflect differently in different schools and affected students' achievement differently.

In a summarized view, Ajayi (2010), also in Nigeria had assented that availability and use of quality educational facilities such as classrooms, school buildings, chairs, tables and laboratories had huge positive impact on the academic achievement of every school student. Therefore, decent school physical facility is of critical value. This is similar to Chukwu, Eze and Agada (2016) who investigated the effect of Availability of Instructional Materials at the Basic Education Level in Enugu Educational Zone of Enugu State of Nigeria. The study examined the availability of instructional materials at the basic education level in Enugu Education Zone of Enugu State, Nigeria and found that, availability of resources was critical.

In the East African region, Namusisi, (2015), in Uganda conducted a research study whose study findings showed that well-designed classrooms increased learning progress in reading, writing and Math by 16%. This agrees with another study that was done by Arul (2012), in Nigeria west Africa. The two studies concur with the view that learning environment is an arena that exerts greater influence on learner performance. This happens more especially when co-curricular activities, teaching techniques and appropriate relationships were provided, developed, maintained and are well-coordinated. This is as described by Rohana (2009) who described learning environment as a formal organization where teachers and students' activities were planned, organized and controlled from within and without. According to him, formal learning environment is influenced physically internally and externally. On their part defined secondary school learning environment as the physical, academic, social and cultural environments.

Lyimo, Too and Kipng'etich (2017), in Tanzania investigated the Perception of teachers on availability of instructional materials and physical facilities in secondary schools of Arusha District, Tanzania. This study investigated on teachers' perception on availability of instructional materials and physical facilities in secondary schools of Arusha district, Tanzania. The study concludes that there is inadequate number of textbooks, reference books, maps and globes in schools under investigation due to increase of students in Community Schools. Further, schools have inadequate physical facilities such as classrooms, desks, chairs and the available classrooms are poorly constructed with inadequate spacing. Researchers recommend that Curriculum developers at Tanzania Institute of Education together with policy makers should come up with a policy guideline that will enhance provision of instructional materials and physical facilities

In Kenya Osundwa (2016) explained that the school learning environment was a composition of physical, social, academic and cultural environments that have greater influences on students' learning and academic achievements. Earlier studies done in Kenya by Eshiwani (2009) and Sifuna (2000) have offered mixed signals on the role of the school learning environment especially effects of the school learning environment and association with student achievements. This is because Sifuna (2000) considered learning environments as key to school output, whereas Eshiwani (2013) thought it otherwise. Such conflicting viewpoints reflected greater gaps that needed to be investigated. In Makueni County, Kitonyi (2013) investigated the Influence of Learning Environment on Pupil Academic Performance in Kenya Certificate of Primary Education in Kaiti Division, Makueni County. The study revealed that different learning environments contributed to poor performance in the schools in this area and necessitated the need to investigate on the school and home environment affecting the academic results in KCPE. The study examined the relationship between school environment, psychological environment and home environment and how they all influence the academic performance of the pupils. Descriptive survey design was used. The target populations were pupils, and teachers from public primary schools in Kaiti Division. Stratified random sampling was used in selecting the population sample. Instruments for data collection were questionnaires for teachers and pupils. Data was collected in selected schools in the division using the questionnaire designed. The data was then processed using Statistical Package for Social Sciences (SPSS). The study concluded that the major factors hindering pupils' performance were lack of teaching and learning resources, lack of adequate physical facilities, and very high Teacher Pupil Ratio. The ratio of the latrines for both genders was very high and therefore the hygiene and sanitation facilities were not adequate and therefore low cleanliness of the toilets rendered the school environment non conducive for learning. The lack of learning and teaching resources negatively influenced the pupils' achievements. The teachers used participatory method of teaching as they allowed the pupils to ask questions. The participatory method of teaching by the teachers served to enhance the learning environment as the pupils were part of the learning process. The learning environment at pupils' homes was not conducive for learning which contributed to poor performances.

Another study done by Korir and Kipkemboi (2014) investigated the Impact of School Environment and Peer Influences on Students' Academic Performance in Vihiga County, Kenya. The study examined the impact of school environment and peer influence on the students' academic performance. The study assessed school environment factors and peer influences in terms of the level of psychological impact they have on learners. The study was based on Albert Bandura's Social Learning Theory, which considers learning as an interaction between environment, behaviours, and one's psychological processes. The study concluded that conducive learning environment is very essential for effective teaching and learning and recommendations were made among which includes, that government and other education stakeholders should make concerted efforts to build more classrooms in secondary schools that would help to reduce problem of overcrowding and create enabling teaching and learning environment; that adequate furniture should be provided and students should be oriented on how to maintain these facilities because most times students destroy these facilities by themselves.

In regards to public secondary school students' academic achievements in Marakwet East Sub-County, a very small number of form four students have been joining tertiary and public universities for the past five years, 2015-2019 periods. According to the Sub-County Director of Education, (MOE, 2018) mean scores for secondary schools have shown a downward trend since 2015. The performance mean scores for the Sub-County were; 4.432 in 2015, 3.542 in 2016, 3.241 in 2017, 3.023 in 2018 and 3.012 in 2019. Based on the above, performance and resultant academic achievements by students leaving from form four level of secondary school education in the entire Sub-County has therefore been of much concern to parents, teachers, educators and other interested stakeholders. The neighbouring Sub-Counties had a sizeable number of both boys and girls doing well that cannot be compared with the numbers from the area of study. Therefore, the need to carry out this study to establish the effects of the learning environment on public secondary school students' academic achievements especially in national examinations, KCSE. To this end this study is necessary to investigate assumptions and effects of existing learning environment on secondary school students'



academic achievements in public schools in Marakwet East Sub-County, Elgeyo Marakwet County. It was also necessary to carry out the study in this area so that challenges could be highlighted for the stakeholders to provide solutions that would improve schools' learning environment for enhanced academic achievements.

### **1.1. Statement of the Problem**

Quality of secondary school learning environments determines how long school output will be realized. Comfortable learning environments such as classrooms, motivating cultural and social activities, and appropriate learning inputs are expected to spur improvement and increased teaching quality and academic achievements. These facilities are either not there or are limited in supply and poorly maintained. The Kenya government has provided support grants and subsidies for schools' infrastructural development that aims at procuring, building or improving, and maintaining existing learning environments in place. Through community initiatives, the government has provided grants for running low-cost Day Schools with guidelines on management administration and implementing funded secondary school projects. This has eased congestions in boarding schools. Parents and teachers on the other hand have provided requisite materials for school improvements, while stakeholders in education have made efforts to make available requisite materials and equipment to the schools, paid fees and other school levies, mobilized resources and even built more secondary schools. Some girl-child support movements such as the Christian Children's Fund (CCF), Area Development Programme (ADP) under World Vision Kenya and the local Faith-Based Organizations have been funding, providing guidance and learning materials to some schools. They have also funded short courses for teachers, and co-curricular and curricula competitions for schools with the aims of spurring improvements in academic achievements. Despite these many endeavors by government and stakeholders in education through community participation, the secondary schools have not produced adequate grades and numbers of form four secondary school students with requisite academic results and qualification grades in national examinations for joining tertiary or university education and training.

## **2. METHOD**

### **2.1. Research Design**

The study was conducted in Marakwet East Sub-County in Kenya. The research study design was mixed embedded methods research design where qualitative was embedded with quantitative research approach. This entailed use of both quantitative and qualitative methodology of causal comparative (quantitative) and ethnographic designs (qualitative) that allowed the researcher to examine the relationships between the two variables of learning environment and academic achievement. The study also employed ethnographic type of qualitative research design. The rationale for choosing this design was because the item of study which is a more complex and a contemporary issue that required advanced contemporary approaches that can provide solutions to present day challenges like poor academic achievements by secondary school students in public schools. All public secondary schools were listed and a strata was developed. The researcher used simple random sampling procedures to obtain a representative sample for the study.

### **2.2. Sampling**

The study targeted all the 18 secondary schools, all the 140 teachers, all the 18 secondary school principals and all the 18 Directors of Studies. The researcher also targeted Kenya Certificate of Secondary Examination achievement or results (KCSE) because this Sub-County has been scoring very low for the years 2016-2019 compared to other neighbouring Sub-Counties of Elgeyo Marakwet County.

A sample of 72 teachers out of 140 teachers was selected. Teachers in the participating schools were stratified into three strata namely: Mixed schools, Girls' only schools and Boys' only secondary schools. Later on proportionate sampling was used to select teachers from each of the categories of schools. For boys' schools proportional sampling was done as follows  $42/140 * 103 = 30$ ; for girls' schools  $44/140 * 103 = 32$ ; and mixed schools  $54/140 * 103$ . Simple random sampling was then used to select individual teachers from each of the categories. Directors of Studies and Principals of participating schools were automatically picked.

### 2.3. Research Instruments

Data for the study were collected using research tools that included; Questionnaires, Observation schedule, Interview schedules, and Document analysis

### 2.4. Validity of Instruments' Results

The research instruments were subjected to three independent experts in education. These were the Catholic University lecturers, Ministry of Education official and the County education field officer who are specialists in educational administration, measurement and evaluation. They were each given the instruments to read through, ascertain and make informed corrections. Their input and recommendations were incorporated into the tools. This made the research instruments achieve requisite validity of research instruments' results. The research instruments were also pilot-tested in schools that did not participate in the study but schools within Marakwet East Sub-County.

### 2.5. Reliability of the Instrument Results

Test re-test approach was utilized to determine the reliability of the instrument results, which was found to be 0.75. This was done through administering the same questionnaires more than once to the same respondents. The Pearson Correlation coefficient was used to interpret quantitative data. The results of the first and second test administration were correlated. The data from qualitative documents were transcribed and grouped into themes and sub-themes as they emerged at the time of data collection.

### 2.6. Data Analysis

The collected data were analyzed using inferential and descriptive statistics. Means, standard deviations and percentages were employed. Hypotheses were tested using independent sample t-test and ANOVA.

## 3. RESULTS AND DISCUSSIONS

### 3.1. Means and Standard Deviations of Teachers Rating of Learning Environment in public Secondary Schools in Marakwet East Sub County

The first research question sought to determine the learning environment that exists in public secondary schools in Marakwet East Sub County. A total of 72 teachers were asked to rate the learning environment in their schools. A 5-point rating scale was used to score the responses. It had the following scores; 1 = Very negative, 2 = Negative, 3 = Moderate, 4 = Positive, 5 = Very positive. To determine the minimum and maximum length of the 5-point rating scale, the range was calculated by  $(5 - 1 = 4)$  then divided by five as it is the greatest value of the scale  $(4 / 5 = 0.80)$ . Afterwards, one which is the least value in the scale was added in order to identify the maximum of this cell. The length of the cells is given as 1 – 1.80 (Very negative), 1.81 – 2.60 (Negative), 2.61 – 3.40 (Moderate) 3.41 – 4.20 (Positive) and 4.21 – 5 (Very positive). Data from the teacher's questionnaire regarding the learning environment in the three types of school under study namely boys' schools, girls' schools and mixed schools is presented in Table 1.

**Table1.** Means and Standard Deviations of Teachers Rating of Learning Environment in Public Secondary Schools in Marakwet East Sub County

Teaching and Learning Environment	Types of School					
	BOYS		GIRLS		MIXED	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Instruction follow the laid down MOE polices	4.25	.967	3.17	1.50	3.00	.00
School norms	4.05	1.23	4.06	1.16	2.91	1.64
School follow national curriculum	4.70	.470	3.83	1.42	2.35	1.47
Professional development	2.90	1.48	2.67	1.46	1.94	.983
Teachers instruction include different variety of teaching	4.05	1.23	3.72	1.53	3.74	1.46
	BOYS		GIRLS		MIXED	

Physical Environment	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
There is manageable workload and class size	2.95	1.61	1.56	.856	2.09	1.19
Resources are kept clean and well maintained	4.15	1.098	4.11	1.32	1.88	1.04
School supports sports and games	4.50	.513	4.17	.857	3.35	1.55
Classrooms are spacious and with enough furniture	4.00	1.30	2.78	1.23	3.18	1.57
Students boarding facilities are accommodative	4.35	.670	4.17	1.15	1.86	1.13
Social Environment	BOYS		GIRLS		MIXED	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Students and teachers engage in interactions in and outside class	4.15	1.09	4.11	1.28	1.76	.819
Teachers and students are enabled to influence school decisions	4.00	1.30	2.83	1.29	3.76	1.52
All genders are provided equal opportunities in the learning	4.05	1.32	4.00	1.14	1.97	1.19
Teachers manages and controls classroom activities effectively with the help of class leaders	4.10	1.21	2.78	1.22	2.44	1.42
Open communication between teachers and students	4.70	.470	4.17	.857	3.74	1.46

**Note:** Very negative (Mean 0 - 1.80), Negative (Mean 1.81 - 2.60), Moderate (Mean =2.61 – 3.40), Positive (3.41 – 4.20) Very positive (4.21 - 5)

As indicated in Table 1 the learning environment in public secondary schools in Marakwet East Sub County was categorized into 3. This included the teaching and learning environment, the physical environment and the social environment. These main categories had varied statements that described the main categories. Regarding the first category which was the teaching and learning environment in the public schools in Marakwet East Sub County the study found out that boys' schools had a very positive teaching and learning environment regarding instructions followed in the laid down MOE policies (Mean = 4.25, SD = 0.967), girls and mixed schools had a moderate teaching and learning environment as indicated by (Mean = 3.17, SD = 1.50 and Mean = 3.00, SD = 0.00) respectively. This information indicated boys' schools had instructions that followed laid down MOE policies which were more positive than the mixed and girls' schools. This finding implies that boys' schools adhered to policies such as having effective text books ratios against students, having a teaching work force with TSC numbers, clock in and clock out for teachers, having students' council representatives in the board meetings among other policies more than the mixed and girls' schools.

Interview excerpts from the Principals in the three types of schools had this to say:

As a school and as a department we ensure that we follow the laid down Ministry of Education policy guidelines. Part of the guidelines that we adhered to include having the KICD syllabus booklets that enables our teachers to prepare the schemes of work adequately. The school keeps a file on all public circulars in order to be at par with the instructions there- in. (Principal in a Boy' school).

Another Principal in a mixed school had this to say:

This being a day's school we have put in place measures to ensure that all students are tracked. This include though not limited to a daily marking of the school register. Class teachers also have in their possession parents' contacts. This enables the school to make follow up in the event a student is absent from school for a number of days that can warrant worry (A Principal mixed school).

On the MOE policies another Principal in a girls' school reported that they abide by the ministry of education policy regarding the Free Day Secondary School tuition. She had this to say:

We have registered our school on the NEMIS portal which is responsible for the management of the education in the country. Additionally, the schools have registered all the students in the NEMIS portal. This includes the students' personal details and the parents' contacts. Because of this the school is able to receive capitation to enable the teaching and learning activities in school run smoothly (A Principal in a girl's school).

Lastly, a Director of Studies (DOS) mentioned that they follow MOE policies to register all students for national examinations. The DOS mentioned the following: -

Every year we ensure that our students are registered duly to sit for exams at the end of the year. This is attained through the registration of students for KCSE. (A DOS in Boy's school).

These findings were similar to those by Nwadiani (2010), in a study on learning environment who said that an individual students' acquisition of skills, new knowledge and competencies would occur under certain conditions and influences. The author had said that learning environment was reflected by curricular and co-curricular activities in which teachers and students engaged in classrooms, libraries, laboratories and other places in the school.

Further information in Table 1 indicated that boys' (Mean = 4.05, SD = 1.23) and girls' schools (Mean = 4.06, SD = 3.83) had a moderate teaching and learning environment in regards to school norms. These findings indicated that mixed schools were not adequately developed in terms of schools practices and standards that were inclined towards a conducive teaching and learning environment as compared to the boys' and girls' schools. In line with this was an assertion by Olagboye (2004), who suggested that norms in schools were capable of influencing students and teachers positively if adequately provided and maintained.

Data in Table 1 indicated that the schools had varying levels in terms of following the national curriculum. Boys' schools had a very positive environment in following the national curriculum as indicated by (Mean = 4.70, SD = 0.470), girls had a positive environment (Mean = 3.83, SD = 1.42) and mixed schools had negative environment as indicated by (Mean = 2.35, SD = 1.47). This implies that the students in mixed schools could be having probably teachers who were not very qualified, thus the negative environment.

Interviews indicated that schools were in the practice of following the national curriculum. A Principal excerpt regarding this is indicated below:

In order to ensure that we have a conducive learning environment the school has put in place a quality and standards office that is responsible in ensuring that teachers followed the national curriculum. Schemes of work are approved by the Head of department. Besides teachers are required to update their records of work and lesson notes periodically.(A Principal in a mixed school).

As indicated in Table 1 professional development was moderate in boys' schools (2.9, SD = 1.48), it was also moderate in girls' schools (Mean = 2.67, SD = 1.64) while mixed schools it was negative (Mean = 1.94, SD = 0.982). These findings revealed that teachers in these schools were not positively involved in their professional development with institution such as Kenya Educational Management Institute. Apparently teachers and the Principals were not pursuing further education at a master's level and the doctoral level. Regarding teachers having time for professional and non-teaching work boys' and girls' had a moderate environment while mixed schools had a negative environment. Boys schools had a (Mean = 2.70, SD = 1.63) while girls' schools had a (Mean = 2.67, SD = 1.64) and mixed schools had a (Mean = 2.12, SD = 1.32). This implies that teachers were not positively participating in other activities that were not academic in nature such as community service.

Interview with Principals indicated that professional development amongst teachers. The following excerpt explains this: -

Professional development among teachers is moderate in our school. This has been occasioned by the TSC guidelines that to some extent don't recognize other career progression pathways other than theirs. This has discouraged teachers in enrolling for further studies. (A Principal in a mixed school).



Another Principal noted that schools were located in areas of no internet connectivity thus making teachers not to enroll in online programmes.

Some online courses that are carried out online such as the KEMI modules are not accessible owing to the poor connectivity of schools. (A Principal in a mixed school).

Darling-Hammond (2017), in a study on teacher education around the world had similar view. His study had found that most school heads did not have masters and doctoral qualifications.

Table 1 indicated that boys' schools provided a slightly better teaching and learning environment that incorporated teachers who used varied instructional resources, as compared to girls and mixed schools. This was shown by a positive environment in boys' schools (Mean = 4.05, SD = 1.23), a positive environment in girls' school (Mean = 3.72, SD = 1.53) and a positive environment in mixed schools (Mean = 3.74, SD = 1.46). Mastery-oriented beliefs predicted teacher efficacy for student engagement and classroom management. The socio-economic level of the school and teacher gender predicted teacher efficacy for engagement, classroom management, instructional strategies, and a mastery goal orientation. Being male predicted a performance goal orientation. Findings in a study done by Rubie-Davies, Flint and McDonald (2012), on teacher beliefs, teacher characteristics, and school contextual factors showed that teacher beliefs, teacher characteristics, and school contextual variables could result in differences in teacher instructional practices and differing classroom climates. Further investigation of these variables is important since differences in teachers contributed to differences in student outcomes.

Regarding the second category which was the physical environment in the public schools in Marakwet East Sub County the study found out that boys' schools had a moderate physical environment in which there was manageable workload and class size as indicated by (Mean = 2.95, SD = 1.6051, mixed schools had a negative environment in regards to work load and class size (Mean = 2.09, SD = 1.19). On the other hand, girls had the least score indicating a (Mean = 1.56, SD = 0.856) which was rated as very negative. This information indicates that boys' schools had a slightly better environment in terms of work load and class size while girls had a very negative physical environment. This finding implies that teachers in boys' schools had a moderate teaching and non-teaching work thus reflecting a good physical environment to perform work. Further information in Table 1 indicated that boys (Mean = 4.05, SD = 1.32) had a positive environment in terms of resource adequacy which was observed by the school management, girls' had a (Mean = 2.06, SD = 1.11) had a negative physical environment in regards to resource adequacy, similarly mixed schools had a negative physical environment in terms of resource adequacy as indicated by (Mean = 1.97, SD = 1.19). These findings indicated that mixed schools and girls' schools were not adequately developed in terms of resource adequacy. This concurred with Ajayi (2010), studyfindings where he was quoted saying that the availability and quality educational facilities such as classrooms, school buildings, chairs, tables and laboratories had positive impact on the students' academic achievement.

Data in Table 1 indicated that the schools had varying levels in terms keeping resources clean and being well maintained. Boys schools had a positive environment in keeping the resources well and maintaining them as indicated by (Mean = 4.15, SD = 1.09), girls had also a positive environment (Mean = 4.11, SD = 1.32) and mixed schools had negative environment as indicated by (Mean = 1.88, SD = 1.04). This implies that the students and teachers in mixed schools were operating in not so good physical environment. The classes were perhaps old, worn out in term of paint and dilapidated thus occasioning the poor state of physical facilities. For instance, the US National Centre for Educational Statistics (NCES, 2014) report indicated that school facilities across the United States needed face lifts since 53 percent of the facilities were rated as satisfactory. The American Society of Civil Engineers (ASCE, 2013) report indicated schools were in dilapidated conditions and seriously required to be renovated to make the schools' learning environments safe and comfortable for the learners. ASCE assessment of America's schools was observed as of grade "D" due to the conditions then, as there was lack of enough spaces in laboratories, few electric outlets, inadequate running water, and more safety features like eye washing stations.

The physical environment in regard to sports and games environment showed the three types of schools having between a very positive and moderate environment. This is indicated in Table 1 in

which boys' schools had a (Mean = 4.52, SD = .513), it was positive for girls' schools (Mean = 4.17, SD = .857) while mixed schools it was moderate (Mean = 3.35, SD = 1.55). These findings reveal that teachers in these school students were positively involved in co-curricular activities that encompassed sports and games, and that is why these resources had an environment that support the activities. These findings are in line with Osalusi (2011), study on the learning environment and secondary school effectiveness in Nigeria which revealed that, there was a significant relationship between learning environment and school effectiveness. Secondary schools in the south-west were to a large extent found to be effective and the psychomotor domains of learning were effective but not all were effective in the cognitive domain. Psychomotor domain deals with co-curricular activities that entail sports and games.

Regarding classrooms being spacious and with enough furniture finding in Table 1 indicated that boys had a positive environment (Mean = 4.000, SD = 1.29), girls had a moderate environment (Mean = 2.78, SD = 1.22) while mixed schools had a Mean of 3.18, SD = 1.51. The moderate environment in mixed schools may be attributed to the possible low enrolment in most of the mixed schools therefore occasioning the spacious classrooms. In a study by Zurita (2005) wireless learning environments were regarded as more suitable than ordinary classroom or computer classroom for supporting teaching and learning based on learner-centred teaching methods which Zurita et al (2005) described as active, productive, creative, and collaborative learning methods. Students require quality classrooms, libraries, school buildings, furniture, text books, socialization and sporting equipment because they impact positively on students' academic achievements.

Table 1 indicated that boys' schools had a very positive environment regarding students boarding facilities that were accommodative as indicated by (Mean = 4.35, SD = .671), girls' schools had positive boarding environment as indicated by (Mean = 4.17, SD = 1.15) while mixed schools provided a negative environment (Mean = 2.53, SD = 1.45) in terms of boarding facilities. The negative boarding facilities environment in mixed schools can be explained in relation to the fact that most of these schools are day schools thus the lack of boarding facilities to accommodate students who apparently commute from school to their homes. In line with this is Osalusi (2011) study on learning environment and secondary school effectiveness in Nigeria which revealed that, there was a significant relationship between learning environment and school effectiveness. Secondary schools in the south-west were to a large extent found to be effective and the psychomotor domains of learning were effective but not all were effective in cognitive domain.

Regarding the third category which was the social environment in the public schools in Marakwet East Sub County the study found out that boys' schools and girls' schools had a positive environment in terms of students and teachers engaging in interactions in and outside class as indicated by (Mean = 4.15, SD = 1.09) and (Mean = 4.11, SD = 1.28) respectively, while mixed schools had a very negative environment in regards to students and teachers' interactions in and outside class. This was similar with Bascia (2014), assertion that the physical learning environment of a school was consisting of social, an individual learner, formal teaching and informal learning processes that took place in and outside the school, which he said should be organized to suit the schools. The interactions of these elements helped in reforming the school operational cultures, modified learning, made it flexible and gave support to all the learning processes and students' academic achievement.

The very negative environment in mixed schools was attributed to the nature of day schools in which interaction was limited to when students report to schools at around 7.30Am in the morning and when they left for home at 4 pm in the evening. There was absolutely no interaction in the weekend as students and teachers were in their homes. Further information in Table 4.2 indicated that girls' (Mean = 4.17, SD = .858) had a positive social environment in terms of instructions that were interactive and adjusted to learning practices. This was slightly better than boys' schools which also had a positive but lower social environment (Mean = 3.8, SD = 1.19). On the other hand, had a negative social environment in regards to interactive learning practices (Mean = 2.59, SD = 1.49). This finding indicates that owing to the nature of mixed schools in which learning practices were limited such a social environment is expected. The concept of learning environment has been viewed by Sariola (2011), as an environment for the teachers and students' activities within which learning was seen as an active process in a multi-information and co-operational network environment. Learning environment is about more than the structures, it is about the social relationship within the space.

Table 1 indicated that boys' schools had a positive environment in regards to teachers creating a relaxed atmosphere as indicated by (Mean = 4.15, SD = 1.09), similarly girls' schools had positive boarding environment though slightly lower than boys' schools' as indicated by (Mean = 3.72, SD = 1.53) while mixed schools provided a moderate environment (Mean = 3.35, SD = 1.55). In a study by Bosede (2010), in Nigeria revealed that the issue of quality education goes beyond the curriculum or subject content and also included learning environment and school factors. This study confirmed views by Ajao (2001), whose study found coordination of the school learning environment to better academic achievement. Other studies like those conducted by Lumpkin (2013), had claimed that students' achievement was lower in schools with deficient buildings, while the results were better in those with improved buildings. According to this study, students who experienced a caring school community become more motivated and engaged in their learning.

Further findings indicated that boys' social environment in which teachers managed and controlled classroom activities effectively with the help of the class leaders was positive (Mean = 4.1, SD = 1.21) while girls' schools as indicated in Table 4.2 had a moderate environment as indicated by (Mean = 2.78, SD = 1.22). Mixed schools had a negative environment (Mean = 2.44, SD = 1.42). There was open communication in all the schools with boys having a very positive open communication (Mean = 4.7, SD = 0.70), girls had a positive environment (Mean = 4.17, SD = 0.858) and mixed schools having a positive (Mean = 3.7, SD = 1.46). A lower rating in the mixed schools may be attributed to students' attitude while in class. Open communication may be impacted when both genders were involved unlike when there is a single gender involved.

Lastly, Table 1 indicated that, boys' schools had a very positive environment (Mean = 4.45, SD = 0.756) in terms of teachers valuing students' contribution and praising them accordingly, mixed schools had a moderate rating (Mean = 2.79, SD = 1.59) while in girls' schools this environment was very negative (Mean = 1.56, SD = 0.856).

### **3.2. Level of Academic Achievement of Public Secondary Schools in Marakwet East Sub County**

The second research question sought to determine the level of academic achievement in public secondary schools in Marakwet East Sub County. A document analysis was done to obtain KCSE performances in schools in the years 2016 – 2019. Data from the document analysis guide regarding the level of academic achievement in the three types of school under study namely boys' schools, girls' schools and mixed schools is presented in Table 2.

**Table2.** *Level of Academic Achievement of Public Secondary Schools in Marakwet East Sub County*

	Boys		Girls		Mixed	
	Mean	SD	Mean	SD	Mean	SD
<b>2016</b>	4.53	0.872	3.3	0.361	3.15	0.511
<b>2017</b>	4.67	0.937	3.37	0.363	3.16	0.573
<b>2018</b>	5.34	1.04	3.93	0.366	3.63	0.672
<b>2019</b>	4.89	0.211	4.97	0.291	4.18	0.501

Findings in Table 2 indicated that boys performed better than the girls' schools and mixed schools in the 2016 KCSE. Data indicate that boys' schools had an average mean of 4.53 with a positive deviation of 0.872 from the overall mean in 2016. Girls had a mean of 3.3 while mixed schools had a mean of 3.15. This result shows that boys' schools performed better than girls and mixed schools. The range between the high and low performers in 2017 was 1.51 as indicated in Table 4.6. In this year just like the preceding year boys' schools (Mean = 4.67) performed better, the boys' schools were followed by girls (Mean = 3.37) then lastly the mixed schools at 3.16. It is useful to note that the schools recorded an upward trend in performance. Table 4.3 indicated that in 2018 mixed schools were the low performers while boys' schools were the high performers in KCSE. Lastly, but importantly Table 4.3 in 2019 indicated that girls performed better (Mean = 4.97) as compared to boys (Mean = 4.88) and mixed schools (Mean = 4.18).

These findings indicated that boys' schools performed better than the other schools in all the years under study apart from 2019 in which girls' achievement was higher than boys. Of critical importance is that mixed schools were out smarted by the other schools in all the years under study.

#### 4. TESTS OF HYPOTHESES

##### There is a Relationship between Type of School and Learning Environment

The first alternative hypothesis  $H_1$ . There is a relationship between type of school and learning environment. Descriptive statistics was conducted to observe the distribution of the data. Table 3 displays the test of homogeneity.

**Table3.** Test of Homogeneity of Variances

Test of Homogeneity of Variances			
Learning Environment			
Levene Statistic	df1	df2	Sig.
.121	2	7	.888

A requirement for the ANOVA test is that the variances of each comparison group are equal. This was tested this using the Levene statistic. Table 3 on the Test of Homogeneity of Variances provides the Levene's Test to check the assumption that the variances of the three types of school are equal; i.e., not significantly different. Finding indicate that the Levene's test is not significant;  $F(2, 7) = .121$ ,  $p = .888$  at the .05 alpha level. Thus, the assumption of homogeneity of variance is met (i.e., not violated) for this sample. This implies that the requirement of homogeneity of variance has been met, and the ANOVA test can be considered to be robust.

**Table4.** ANOVA Output for  $H_1$

ANOVA					
learning					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3.517	2	1.758	5.908	.031
Within Groups	2.083	7	.298		
Total	5.600	9			

A one-way between groups analysis of variance was conducted to explore the relationship between type of school and learning environment. The type of schools was divided into three groups according to their gender (boys' schools = boys gender; girls' schools = girls gender; and mixed schools = boys and girls gender). There was a statistically significant difference at the  $p < .05$  level in learning environment for the three types of school  $F(2, 7) = 5.908$ ,  $p < .05$ . The results in Table 4 indicated that boys' schools had a positive learning environment which was statistically significant as compared to girls and mixed schools.

##### $H_2$ There is a Relationship between Learning Environment and Students Academic Achievement

The second alternative hypothesis  $H_2$  was there is a relationship between learning environment and students' academic achievement. Descriptive statistics was conducted to observe the distribution of the data. Table 5 displays the test of homogeneity.

**Table5.** Test of Homogeneity of Variances

Test of Homogeneity of Variances			
Mean			
Levene Statistic	df1	df2	Sig.
.822	2	7	.478

A requirement for the ANOVA test is that the variances of each comparison group are equal. This was tested using the Levene statistic. Table 4.14 on the Test of Homogeneity of Variances provides the Levene's Test to check the assumption that the variances of the learning environment are equal; i.e., not significantly different. Finding indicate that the Levene's test is not significant;  $F(2, 7) = .822$ ,  $p = .478$  at the .05 alpha level. Thus, the assumption of homogeneity of variance is met (i.e., not violated) for this sample. This implies that the requirement of homogeneity of variance has been met, and the ANOVA test can be considered to be robust.



**Table 6.** ANOVA Output for  $H_2$

ANOVA					
Mean					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3.740	2	1.870	36.379	.000
Within Groups	.360	7	.051		
Total	4.100	9			

A one-way between groups analysis of variance was conducted to explore the relationship between learning environment and students' academic achievement. The learning environment was subcategorized into three (teaching and learning environment, physical environment and social environment). There was a statistically significant difference at the  $p < .05$  level in students' academic achievement in the learning environment  $F(2, 7) = 36.379, p < .05$ .

Findings have indicated that the ANOVA was significant, allowing to accepting the alternative hypothesis, and indicating that there is a statistically significant relationship between learning environment and students' academic achievement. This is consistent with studies done by Koroye (2016), who investigated the extent that physical school environment influences students' academic performance in secondary schools. The study revealed that aesthetic beauty of a school and infrastructural facilities influence academic achievements. The study also found school equipment and instructional materials to have greater influence on student's academic achievements. This study recommended for provision of enough physical facilities in all secondary schools in Baylsa State by Nigerian government to enable students to engage in meaningful learning. Similar findings are also elicited by Adewuyi (2012), who argued that conducive learning environment can have effect on both the attitudes and achievement of students. He further added that a positive learning environment is found to be a very important factor of school effectiveness.

## 5. FINDINGS

The study has found boys' schools had moderate physical learning environments in which there was manageable workload and class size. It has also found mixed schools had a negative environment in regards to work load and class size. Further information revealed that the girls' schools had the least score and had a very negative environment. This means the environment discouraged the girls more than the boys.

On school physical environment, obtained information indicated that, boys' schools had a very positive environment (Mean = 4.45, SD = 0.756) in terms of teachers valuing students' contribution and praising them accordingly. Mixed schools had a moderate rating (Mean = 2.79, SD = 1.59), while in girls' only schools the physical environment was very negative (Mean = 1.56, SD = 0.856).

There is a statistically significant relationship between learning environment and students' academic achievement. The study revealed that aesthetic beauty of a school and infrastructural facilities influence academic achievements. The study also found school equipment and instructional materials to have greater influence on student's academic achievements

### 5.1. Learning Environment in Public Secondary Schools

The learning environment was categorized into three namely; the teaching and learning environment, the physical environment and the social environment. The finding indicated that the mean summary for the boys' and girls' schools regarding the teaching and learning environment was positive. The two schools were positively better as compared to the mixed schools. In relation to the physical environment boys' schools had again a positive environment which was better than girls' schools which was moderate. It is important to note that the mixed schools had a negative physical environment. Lastly, but importantly is to note that, the social environment for the boys' and girls' schools was positive as compared to mixed schools which was moderate.

### 5.2. Level of Academic Achievement of Public Secondary Schools in Marakwet East Sub County

The second research question sought to determine the level of academic achievement in public secondary schools in Marakwet East Sub County. Findings show that boys schools performed better than the girls' schools and mixed schools in most of the years. Of critical importance is that mixed schools were out smarted by the other schools in all the years under study.

## 6. CONCLUSIONS

There was a statistically significant difference at the  $p < .05$  level in learning environment for the three types of school  $F(2, 7) = 5.908, p < .05$ . Therefore, the study concludes that, boys' schools had a positive learning environment which was statistically significant as compared to girls and mixed schools. There was a statistically significant difference at the  $p < .05$  level in students' academic achievement in relation to the learning environment  $F(2, 7) = 36.379, p < .05$ .

## 7. RECOMMENDATIONS

Based on the study finding, undoubtedly, the learning environment is crucial determinant of the academic achievement of learners. Consequently, there is need for concerted efforts by the public secondary schools to ensure they develop an effective teaching and learning, physical and social environment. Since the schools in Marakwet East Sub-County lack sufficient classrooms more so mixed schools, and by extension the Sub-County schools, there is greater need for concerted efforts by the school management in seeking more funding to cater for the construction of more classrooms, laboratories and libraries and spacious grounds for all school learning activities.

Information Communication and Technology which was lacking in most of these schools need to be availed to make learning more interactive. Teachers need to be taken for workshops and encouraged to progress career wise. This will complement their methodological capabilities.

So as to improve the performance of both male and female students, all genders need to be provided with equal opportunities in the learning environment. There is need to avail more teaching and learning resources particularly in the sciences. Through the CDF mixed schools should be provided with funds for the construction of laboratories.

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