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# Assessment of Equality of Educational Opportunity Based on Adequacy of Selected School Physical Resources in Public Secondary Schools in Central Region, Kenya

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## ABSTRACT

The study focused on determining the equality of educational opportunity based on the distribution of selected school physical resources and its association with academic performance in public secondary schools within the Central region in Kenya. The generally low and widely varied academic performance between schools raised the study question of what was the status of physical resources adequacy and whether the distribution of the physical resources assured the equality of education principle. The study was anchored on General systems theory and Ex-post facto research design. Mainly, quantitative data were collected and analyzed using descriptive statistics and inferential statistics (Kruskal Wallis H-test and Man Whitney U-test). Findings of the study indicated that the adequacy of most physical resources was wanting and distribution was uneven. The relationship between physical resources adequacy and academic performance was positive and significant for most of the resources, implying that performing schools were better resourced in a biased way that violated Equality of educational opportunity principle. The study recommended, among others that government to not only prioritizes resourcing of all public secondary schools in the study locale with essential physical resources that meet learners' educational needs but also ensure that available resources are distributed fairly across all public schools of the same level. Vigilance and frequent school inspection by quality assurance and standards officers to ensure compliance can be instrumental in this endeavor. Future studies can focus on other differentiated school practices and processes that may adversely impact on equality of education opportunity of learners in public or private secondary schools.

## INTRODUCTION

The wide and still growing appreciation of the intrinsic and material benefits of education to individuals and society since the Education for All (EFA) goals of 1990 has over time, led to a more legal and rights-based approach to education in many countries (Hanushek &Woessmann, 2015). At the heart of this popular demand for education is the realization that what actually matters is not just schooling but the level of quality and inclusivity considerations adopted which ultimately influence learning outcomes (Pudasaini, 2025; Ismael, 2015). Crouch *et al.,* (2021) for example on a study focussing on global learning crisis underscored the rationale of countries to address issues of inequality in education as this often translate not only to high variation in learning outcomes but also to overall low average academic mean scores. While policy direction like UNESCO convention against inequality and clarion call by education vision 2030 for quality and inclusive education for all have been loud and clear (UNESCO,1960; UNESCO, 2016), educational challenges in this area still abounds. Uwezo (2021) for example recons that in its analysis of learning assessments in Kenya since 2009 to date, inequality in learning outcomes at basic education institutions has persistently been a formidable barrier to realization of universal basic education.

While learning outcomes are not expected to be exactly the same (equality of outcomes), due to heterogeneity of learner's abilities, choices and efforts, the variations in the outcomes should not, however, be accounted for or contributed by variations in learning inputs between schools as this needs to be equalized so as to level the playing field for all learners. Relatively wide variations in learning achievement of learners (like the case in the study locale) may reflect equality of educational opportunity gaps that need to be addressed particularly the status of inputs that ultimately may influence learning. The basic requirement is that all schools in the same level should serve all learners equally and as such equalization of inputs in schools is a necessary starting point. The view is reinforced by the fact that schools serve as importance agents of moulding the society as indicated by the words of the renowned public education champion, Horace Mann, who wrote in the 19th century that education should be taken as `the great equalizer`, and `the balance wheel of the society` that should be accessible to all on the basis of equal opportunity (Rice, 2024, Kapanke, 2020). Pierre Bourdieu , however ,in his social reproduction theory on education (Smith.2020)asserted that school systems have potential to reproduce or propagate rather than thwart ,as is expected, the biased social economic capital of learners and thus critical evaluation of school system practices is imperative .

Kenya`s National gender and equality commission report [NGEC],2016 on the status of equality and inclusion in education indicated that while education

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sector had recorded substantial expansion in basic education since free primary education (FPE) and free day secondary education (FDSE) launched in 2003 and 2008 respectively, the sector had continued to grapple with the challenge of low-quality outcomes. The report observed that the education sector gobbled up huge budgetary allocations and the only way Kenya could get its full value of education investment, as well as achieve its aspiration of becoming a middle-income country by 2030 was by offering quality education in all schools on the principle of equality of education opportunity. Owing to the perpetually low and widely varied learning achievement in national examination in the study locale, the study sought to determine the status of physical resources adequacy and how this adequacy related with the learning outcome observed and thus deduce whether the observed distribution of physical resource inputs in the schools impugned or assured the meritocratic principal of equality of educational opportunity.

## LITERATURE REVIEW

### Concept of Equality of Educational Opportunity (EEO)

Equality is a straight forward quantitative normative approach or principle of distributing a social good (public education) uniformly to all the intended recipients such that everyone receives a similar or comparable share. Equality is a social and moral ideal and the opposite of it is inequality. Inequality should not be a salient feature of public education, rather, it should be eliminated (Cairney *et al.,*2022)

John Rawl clearly avers in his theory of Justice as fairness that;

"All social goods like compulsory education should be distributed equally unless any unequal distribution is meant to make up for the disadvantaged learners [equity] or is meant to improve overall welfare of all learners" (Follesdal 2014 pp 4; Rawls 1999 pp.54)

When it comes to what is termed as educational opportunity (EO), The modern conception is about a three-way relationship between a learner (agent), a barrier and an intended educational goal (Sardoc, 2013:36) In this current study, our agents who need to be treated with equality are secondary school students, the barrier is the level of access to school physical resource inputs in public schools and the goal is enhanced learning output in terms of academic performance.

Educational opportunity (EO) is simply the chance of an agent (A) to attain educational goal (G) in respect of a given barrier (B). Essentially, any learner will be said to have an educational opportunity (EO) as long as the barrier that are militating against him or her and the education goal are not insurmountable. Intuitively, therefore, the availability of varying barriers to a given set of learners causes their chances of academic success to differ significantly causing Inequality of educational opportunity. Providing Equal educational Opportunity does not necessarily, though, imply that all conditions that face learners should be equalised, however, it just implies that some barriers should not be allowed to differentiate learners' performance (Sardoc, 2013)

Those barriers that can justifiably be allowed to differentiate learners' performance for instance, their innate abilities, individual effort and choices can be termed as relevant barriers while those that should not justifiably be allowed to differentiate learners' performance are termed as irrelevant barriers for example gender, race, socio-economic status and even skewed distribution of physical resources in public schools; which is the focus of this current study. Amelioration of any irrelevant barrier is a move towards equalization of education opportunity (Lazenby, 2016: 67)

Over the years in pursuit of EEO, many countries have had protracted policy and legal reforms some of which have emanated from successful lawsuits against inequality. Britain and Germany for example that maintained a discriminative tripartite system of streaming learners by ability as well as Japan that maintained a separate tracking of boys and girls at lower secondary have both moved towards a more comprehensive education system. In USA where the concept of EEO was well crystalized following seminal work by James Coleman and colleagues in 1966 (Coleman *et al.*1966), there has been watershed feats of success ever since. Notable historical lawsuits include the landmark racial segregation case of Brown V board of education of Topeka Kansas of 1957 (National Education Association [NEA], 2024). Another case was Campbell V state of Wyoming of 1995 where education funding inadequacy was put to question (Education Law Centre [ELC], 2023). The state was directed to work out the cost of a basket of educational inputs and services required to deliver quality education to a student and consequently use the figure to fund students in all Wyoming public schools on equal terms. In a similar lawsuit termed William V state of California of 2000, the state was sued for gross dereliction of its non-delegable duty of providing access to essential educational resources and conditions to all students on equal terms. Consequently, the state was compelled (by the courts) to equalize input conditions in all public schools in California (Kopanke, 2020; Thomas, 2005; Jeannie & Martin 2004). The current study sought to investigate whether distribution of physical inputs in public schools in Central region in Kenya influenced variation in learning outcomes and the implication this had on the principle of equality of education opportunity.

### Adequacy of School Physical Resources and Equality of Educational Opportunity

School physical resources is a generic term that can imply all academic and non-academic buildings within a school, as well as instructional and non-instructional materials needed for effective teaching and learning activities (Gatama 2023, Prospery 2019, Glewwe *et al.,* 2013).School physical resources can thus be innumerable in type and diversity, however, the current study is delimited to focus on the following selected curricular and co-curricular

resources ;Science and computer laboratories, libraries, course books, teaching aids, computers, playing fields, as well as games, music and drama resources.

Kuresoi, Lymtane & Koda (2022) conducted mixed method research on influence of school physical facilities on academic performance of students in community secondary schools in Longido district in Tanzania. The study found a significant relationship between physical resources and academic performance and that lack of or insufficiency of physical resources was a major cause of dismal academic performance. Kuresoi *et al.* (2022) research findings were corroborated by another recent and similar study In Kenya by Odongo & Koskei (2024), that sought to investigate impact of classroom and other didactic physical resources on academic performance in public primary school in Belgut sub county. The study just like Kuresoi *et al.* (2022) arrived at a conclusion that physical resources significantly influenced academic performance. In contrast to these two studies, however, a study by Wunti & Hafsat (2017) on impact of school facilities on academic performance in senior school in Bauchi State in Nigeria arrived at a conclusion that there was no significant relationship between student academic performance and physical resource adequacy. The study by Wunti & Hafsat was also corroborated by another similar study which had a global sample Hopland (2013)

Literature review on physical resources adequacy (like in the foregoing research) shows that a plethora of studies focusing on relationship between physical resources and academic performance have focused on justifying importance of physical resources to learning albeit with mixed outcomes some finding positive and significant, others negative and significant and others no relationship at all. Clear interpretation of what this has actually implied on equality of education opportunity has often lacked. The current study seeks to fill this glaring gap by focusing on variation in adequacy of physical resources between school and its relationship with students' performance as an indicator on the status of inclusivity and fairness in schools. Learning outcomes should not be accounted for by variation in school physical resources as this should be equalized in all schools, otherwise, this adversely impacts on equality of education opportunity.

Steinman and Olsen (2022) conducted a study on equality of education opportunity in some Nordic and European countries that assessed variation in school effectiveness for an additional year of schooling. The study used regression analysis but did not find significant relationship between school effectiveness variation and academic performance. This implied that the schools considered largely assured the principle of equality of education opportunity as effectiveness was fairly even in all schools. The current study seeks to assess the variation in adequacy status of physical resources in public secondary schools and its relationship with academic performance and determine the implication of the same on principle of equality of education opportunity. Ideally, in an equal opportunity assured scenario, learning outcomes should not be significantly associated with adequacy of physical resources as physical resources distribution should be equalized in all schools

## MATERIALS AND METHODS

The study was conducted in two counties (Nyeri and Nyandarua) within Central region and they were deemed suitable for the study owing to the fact that all categories of public secondary schools (National, Extra-County, County and Sub-County) were well represented and the study problem of low and widely differentiated learning outcomes was stark amidst an unclear context of physical resource adequacy and equality of educational opportunity.

### Research Design

The research was mainly quantitative and focused on empirically determining and describing the current status of physical resources distribution in schools. This research was predicated on ex-post facto (after -the facts) research design as the antecedent physical resource inputs distribution and academic performance in schools were not manipulated (Creswell 2014). The physical resource inputs that affected learning outcomes were deemed to be established within the context of equality of educational opportunity principle and as such, the Systems Theory guided the study using the Context-Input -Process-Output (CIPO) model advanced by Jaap Scheerens (2013)

### Respondents of the Study

The main respondents of the study were the principals of secondary schools who mainly provided quantitative data on availability of various physical resources and their school performance (mean score) in Kenya certificate of secondary Education examination. Heads of department provided more specific data on nature and capacity of various physical resources related to their respective departments. Sample size derived from Kothari formula (2013), constituted 192 principals, 330 heads of departments and 192 schools from a population of 386 principals,2316 heads of department in 386 schools

### Research Instruments

Data collection was done by use of Principal`s questionnaire and Heads of department questionnaire. The Questionnaire internal consistency and reliability was determined using split-half technique and spearman brown prophesy formula yielding a satisfactory reliability co-efficient of r =.89 and r =.92 for principals' questionnaire and head of department questionnaire respectively (Royal, 2017) Data collected was analyzed using both descriptive and inferential statistics. Inferential statistics were done by use of Kruskal Wallis H-test and Man Whitney U-test as the non-parametric alternatives to One way analysis of variance F-test and independent sample t-test

### Statistical Treatment

Data analysis was done in two main stages. Firstly,

data from each school was collated and summarized to describe the status of various physical resources adequacy in a particular school and its overall school's performance mean score in KCSE. The following stage involved comparing the various schools based on their adequacy status and academic performance to make inference on the nature of the association and its implications on equality of education opportunity. Inferential statistics were done by use of Kruskal Wallis H-test and Man Whitney U-test as the non-parametric alternatives to One way analysis of variance F-test and independent sample t-test. Statistical package for social sciences (SPSS) version 26 data analysis software was used.

## RESULTS AND DISCUSSIONS

Out of a sample of 192 schools ,172 schools were able to fill and return duly completed questionnaires representing a fair questionnaire return rate of 89.6%

### Science Laboratories, Libraries, and Classrooms` Adequacy Status

To determine the adequacy status of the various physical facilities, principals gave the total capacities for each of the three physical infrastructural facility (science laboratories, libraries and classrooms) in their school. This declared capacity for each resource was related with the respective school`s total student enrolment to get the specific physical facility adequacy index which was worked out as a percentage (Wodon, 2016: 11)

Facility Adequacy Index(FAI)=C/P×100%

Where: C is total infrastructural capacity of a particular facility in a given school and P is the e total population of students in the school or the number of students expected to use the facility

For the science laboratories, the Science Laboratory Adequacy Index (SLAI) was 20.47 % which was below the minimum recommended index of 25%. Alarmingly, five schools completely lacked any laboratory facility, while 61 had laboratory facilities available but inadequate. For the Libraries, the average library adequacy index (LAI) was 6.6 % which was below the minimum recommended index of 25%. Alarmingly seventy-eight schools lacked any library facility, while 70 had library facilities available but inadequate.

For the Classrooms, the average classroom facility adequacy index (CFAI) was 105.53 % (average class size of 42.64 students) which was very sufficient capacity as the recommended class size is 45 students per class. The minimum classroom facility adequacy index (CFAI) was 60.58 % (average class size of 70 students) while the largest was 156.5% (average class size of 29 students). Though average adequacy was okey the distribution of students in these schools was uneven-poor planning (Scarcity co-existing with excess capacity) resulting in huge disparities in classroom facility adequacy index (CFAI) as depicted by the huge variance in CFAI of 23.44%. Overall ,144 schools had adequate classroom while 30 had inadequate classrooms

### Association between Science Laboratories, Libraries and Classrooms Adequacy Status and Academic Performance

The facility adequacy index was used to sort school into three groups ,1) not available, 2) available but inadequate and 3) available and adequate. Kruskal -Wallis (K-W) H test and Mann-Whitney (K-W) U test were used to test the association and level of significance

Table 1 shows a weak positive association between science laboratory adequacy status and academic performance as the mean ranks are increasing gradually as adequacy status improves but this association was not significant (X2 (2, N=172) =3, P=.223). The association between libraries adequacy status and academic performance was positive and significant (X2 (2, N=172) =10.6, P=.005) while that of Classrooms was Negative and significant meaning there was a significant higher mean rank for schools with inadequate classroom than those with adequate classrooms (U (30, 142) =892, Z= -4.9, P <.001)

### Implication on Equality of Educational Opportunity

The physical resources adequacy status and its association with academic performance shows that only science laboratories were fairly distributed in a manner that did not violate the principle of Equality of Educational Resources (EEO). Libraries were distributed in a significantly biased way in favor of performing schools. Classrooms were

**Table 1:** Summary table comparing Science Laboratory, Library and classroom resources adequacy and academic performance

| | | **Science Laboratory** | | **Library** | | **Classrooms** |
|---|---|---|---|---|---|---|
| Group | n | Mean rank | N | Mean rank | n | Mean rank |
| Not Available | 5 | 53 | 75 | 73 | - | - |
| Available but inadequate | 61 | 83 | 70 | 97.8 | 30 | 128 |
| Available and Adequate | 106 | 90 | 24 | 97.5 | 142 | 78 |
| Total | 172 | | 172 | | 172 | |
| Test statistics | | H=3<br>df=2<br>r2=0.012 | | H=10.6<br>df=2,<br>r2=0.072 | | U=892<br>Z= -4.9<br>r2=0.072 |
| P -Value | | 223 [NS] | | <.001** | | <.001** |

*Note: * Significance attained at p < .05 level, * * Significance attained at p < .001 Level, [NS] Not Significance*

significantly biased in favor of less performing schools which acted as a moderating variable but still impugned on Equality of Educational Resources (EEO) principle since inequality can only be justified if it is meant to improve the outcomes of disadvantaged group (Equity consideration) or to improve the overall condition of everyone (raise average outcomes) as propounded by Rawl's theory of Justice as fairness (Follesdal, 2014)

**Course books and Other Teaching Aids**

Schools were asked to indicate the adequacy status of course books and other teaching aids in their school based on three categories; not available, available but inadequate or available and adequate

Both course books and other teaching aids were found to be reasonably available as no school reported complete lack of either. In most of the schools (158 out of 172) course books were available and adequate while for the other teaching aids, slightly more than half of the schools (92 out of 172), reported that they were available but not adequate.

**Association between Course Books and Teaching Aids Adequacy and Academic Performance**

To determine the association between course book and other teaching aids adequacy and academic performance the provided school's adequacy status was used to categorize the schools into groups. The mean ranks of academic performance of the groups were compared to determine if academic performance was influenced by the school's course books and teaching aids adequacy status.

Mann-Whitney (K-W) U test was used to test the association and level of significance.

Table 2 shows a Positive but non- significant association between schools' course books adequacy status and academic performance (U (14, 158) =1328.5, Z= 1.246, P = .213) and a Positive and significant association between schools' teaching aids adequacy status and academic performance (U (92, 80) =4435.5, Z= 2.319, P = .020)

**Implication on Equality of Educational Opportunity**

The course book adequacy status and its association with academic performance shows that the distribution of course books was slightly in favor of performing schools though not in a significantly biased way as to violate the equality of educational opportunity, however, for the other teaching aids, the association was positively skewed in favor of performing schools and thus violated the principle of equality of educational opportunity.

**Table 2:** Summary table comparing Course books and teaching Aids resources and academic performance

| | | **Course Books** | | **Teaching Aid** |
|---|---|---|---|---|
| Group | n | Mean rank | N | Mean rank |
| Not Available | - | - | - | - |
| Available but inadequate | 14 | 71 | 92 | 78 |
| Available and Adequate | 158 | 88 | 80 | 96 |
| Total | 172 | | 172 | |
| Test statistics | | U=1329<br>Z=1.2<br>r2=.009 | | U=4436<br>Z=2.319<br>r2=0.03 |
| P -Value | | .213[NS] | | .020* |

*Note: * Significance attained at p < .05 level, * * Significance attained at p < .001 Level, [NS] Not Significance*

**Playing field and Games Resources Adequacy Status**

Schools were asked to indicate the status of their playing field and Games resources including those for drama and music activities.

Out of 172 schools, 5 schools had no playing field at all ,69 schools had available but inadequate Playing field while 98 schools had available and adequate Playing field. Relating to games, music and drama (co-curricular) activities resources, 78 schools had available but inadequate co-curricular activities resources while 98 schools had available and adequate co-curricular activities resources

**Association between Playing field and Games Resources Adequacy and Academic Performance**

To determine the association between playing field and games resources adequacy and academic performance and, adequacy status was used to categorize the schools into three groups ;1) not available, 2) available but inadequate and 3) available and adequate. The mean ranks of academic performance of the groups were compared to determine if academic performance was influenced by the school's playing field or games resources adequacy status. Kruskal -Wallis (K-W) H test and Mann-Whitney (K-W) U test were used to test the association and level of significance

Table 3 shows a positive and significant association between academic performance and both Playing field (X2 (2, N=172) =7.5, P=.024) and games resources adequacy (U (78, 94) =4345, Z= 2.09, P =.037) as the mean ranks are increasing as adequacy status improves

**Implication on Equality of Educational Opportunity**

The playing field and co-curricular activities resources

adequacy status and its association with academic performance shows that the distribution of playing field and co-curricular activities resources were significantly biased in favor of performing schools and thus the equality of educational opportunity principle was violated.

**Table 3:** Summary table comparing Playing field and Games resources and academic performance

| | | **Playing Field** | | **Games, Drama& Music resources** |
|---|---|---|---|---|
| Group | n | Mean rank | N | Mean rank |
| Not Available | 5 | 38 | - | - |
| Available but inadequate | 69 | 80 | 78 | 78 |
| Available and Adequate | 98 | 93 | 94 | 94 |
| Total | 172 | | 172 | |
| Test statistics | | H=7.5<br>df=2<br>r2=.04 | | U=4345<br>Z=2.09<br>r2=0.03 |
| P -Value | | .024* | | .037* |

*Note: * Significance attained at p < .05 level, * * Significance attained at p < .001 Level, [NS] Not Significance*

**Computer Laboratories, Computers and ICT Related Auxiliary Resources Adequacy Status**

For the Computer laboratories, the average computer laboratory adequacy index (CLAI) was 3.32 % which was below the minimum recommended index of 25%. No school had adequate computer lab facilities as the best school only had a computer laboratory adequacy index (CLAI) of 14.9% implying a capacity to serve only about 15% of its population of students. Seventy-five schools lacked any computer laboratory facility, while 97 had computer laboratory facilities available but inadequate.

For the Computer accessibility, the average computer adequacy index (CAI) was 2.4 % which was below the minimum recommended index of 25%. CAI of 2.4 meant that there was dire scarcity of computers- about three computers for every 100 students or a computer student ration of 1:33. No school had adequate computers available for teaching and learning. Sixty-eight schools lacked any computer access for learning, while 104 had some available but inadequate computers learning

For the Auxiliary resources, a package of five ICT auxiliary resources (Electricity and lighting connection, Digital educational content, Internet/ WI-FI, White/smart boards and Sockets in classrooms) were considered.34 schools lacked most of auxiliary resources, 86 schools had some of the resources and could be ranked as inadequate, while 52 had most of the resources and could be ranked as adequate

**Association between Computer Laboratories, Computers and Auxiliary Resources Adequacy And Academic Performance**

The adequacy status for each resource was used to sort schools into three groups; Not available, available but inadequate and available and adequate and the mean rank of the groups compared to determine if adequacy status influenced academic performance. Kruskal -Wallis (K-W) H test and Mann-Whitney (K-W) U test were used to test the association and level of significance

Table 4 shows a shows a Positive and significant association between all the three resources adequacy status and academic performance as mean ranks in academic performance increased as adequacy status improved; Computer Laboratories adequacy status and academic performance (U (75, 97) =4774, Z= 3.509, P <.001), Computer adequacy status and academic performance (U (75, 97) =4774, Z= 3.509, P <.001), ICT Auxiliary

**Table 4:** Summary table comparing Computer Laboratory, Computers and Auxiliary resources and academic performance

| | | **Computer Laboratory** | | **Computers** | | **ICT integration auxiliary resources** |
|---|---|---|---|---|---|---|
| Group | n | Mean rank | N | Mean rank | n | Mean rank |
| Not Available | 75 | 71 | 68 | 64 | 34 | 68 |
| Available but inadequate | 97 | 99 | 104 | 101 | 86 | 88 |
| Available and Adequate | - | - | - | - | 52 | 93 |
| Total | 172 | | 172 | | 172 | |
| Test statistics | | U=4774,<br>Z=3.5,<br>r2= .072 | | U=5038<br>Z=4.7,<br>r2=.13 | | H=9<br>df= 2<br>r2=0.051 |
| P -Value | | <.001** | | <.001** | | <.033* |

*Note: * Significance attained at p < .05 level, * * Significance attained at p < .001 Level, [NS] Not Significance*

resources adequacy status and academic performance (X2 (2, N=172) =9, P=.033)

**Implication on Equality of Educational Opportunity**
Distribution of Computer Laboratories, Computers and ICT Auxiliary resources violated the principle of Equality of Education Opportunity (EEO) as these resources were significantly skewed in favor of performing schools.

**Overall Physical Resources Adequacy Status and Academic Performance**
To determine the overall physical resource adequacy, the adequacy status of all the ten resources was considered for each school. The schools were consequently divided into two groups, those that had most of the resources being adequate and those that had most of the resources being inadequate. Forty-eight schools (28%) were rated as having most of the resources being adequate while the majority 124 schools (72%) had most of the resources being inadequate

**Association between Overall Physical Resources Adequacy and Academic Performance**
The mean ranks for the two adequacy groups (Inadequate for most resources and adequate for most of the resources) were compared to determine if overall resource adequacy status of a school influenced academic performance. Mann-Whitney (K-W) U test was used to test the association and level of significance.
Table 5 shows that overall physical resource adequacy positively and significantly influenced academic performance (U (124, 48) =1682, Z= -4.4, P <.001)

**Implication on Equality of Educational Opportunity**
Distribution of overall physical resources in public secondary schools in the study locale violated the principle of Equality of Education Opportunity (EEO) as most of these resources were significantly skewed in favor of performing schools.

**Table 5:** Summary table comparing Overall physical resources (Combined) and academic performance

| **Groups** | **n** | Mean Rank | **Z** | **U** | **P-value** | **r2** |
|---|---|---|---|---|---|---|
| Rank | Z | 76 | | | | |
| Inadequate (For most resources) | 124 | 113 | | | | |
| Adequate (For most resources) | 48 | | | | | |
| Total | 172 | | -4.4 | 1682 | <.001** | .113 |

*Note: * Significance attained at p < .05 level, * * Significance attained at p < .001 Level, [NS] Not Significance*

**Table 6:** Summary table relating association between physical resources adequacy and academic performance and whether Equality of educational opportunity was assured or impugned

| | **School Physical Resources** | **Relationship (Resource adequacy vs Performance)** | **Significance** | **Interpretation** | **Equality of Educational Opportunity (EEO)** |
|---|---|---|---|---|---|
| **General Curricular** | | | | | |
| 1 | Science laboratories | Positive | Not Significant | Performing students found in resourced schools but bias is not significant | Assured |
| 2 | Libraries | Positive | Significant | Performing students found in resourced schools and bias is significant | Not Assured |
| 3 | Classrooms | Negative | Significant | Performing students are learning in more congested classes and bias is significant | Not Assured |
| 4 | Course books | Positive | Not Significant | Performing students found in resourced schools but bias is not significant | Assured |
| 5 | Teaching Aids | Positive | Significant | Performing students found in resourced schools and bias is significant | Not Assured |
| **Co-curricular** | | | | | |
| 6 | Playing field | Positive | Significant | Performing students found in resourced schools and bias is significant | Not Assured |

| | | | | | |
|---|---|---|---|---|---|
| 7 | Games, music & drama Resources | Positive | Significant | Performing students found in resourced schools and bias is significant | Not Assured |
| **ICTs** | | | | | |
| 8 | Computer Labs | Positive | Significant | Performing students found in resourced and bias is significant | Not Assured |
| 9 | Computers | Positive | Significant | Performing students found in resourced and bias is significant | Not Assured |
| 10 | ICT auxiliary/ support facilities | Positive | Significant | Performing students found in resourced and bias is significant | Not Assured |
| 11 | Overall/Combined physical Resources | Positive | Significant | Performing students found in resourced and bias is significant | Not Assured |

Table 6 clearly shows the summary of physical resource adequacy distribution with respect to students' academic performance. The table shows that performing schools are better resourced in a biased way in most of the considered categories of physical resources and thus there is a general violation or failure to assure equality of educational opportunity with respect to physical resources distribution. Classrooms space distribution is conversely opposite since the bias is in favor of less performing students. This scenario, however, does not as well assure equality of education opportunity but may signify performing schools are preferred and thus record disproportionate students' enrollments leading to congested classrooms (Bayo &Paglinawan, 2025). Only science laboratories and course books distribution patterns are not significantly associated with academic performance and as such equality of education opportunity is not violated at least in respect to these two physical resources distribution. When all ten categories of physical resources are considered together, adequacy of physical resources is positively and significantly associated with academic performance implying that performing students are learning in better resourced schools and this bias is significant. Physical resources distribution thus generally violates the principle of equality of education opportunity in the study locale.

## CONCLUSION

Inadequacy of physical resources was a common challenge shared by most schools though the intensity varied from one school to another. Moreover, several resources were completely lacking in some schools particularly Libraries, science labs, computers, computer laboratories, ICT auxiliaries and even playing fields. The distribution pattern of these physical resources in the schools within the study locale could thus generally be described as uneven as some schools recorded complete lack of some essential physical resources, most had available but inadequate resources while other recorded perfect physical resources adequacy. When the resource adequacy status of the schools was related to overall learning outcomes, it emerged that for a majority of the resources considered, physical resources adequacy status was positively and significantly associated with academic performance. This implied that distribution of physical resources was biased or skewed in favor of performing schools and therefore equality of education opportunity principle was grossly violated.

a) Government through the ministry of education and school authorities to urgently prioritize resourcing all schools in the study locale with essential physical resources

b) Need to rationalized distribution of physical resources so as to eliminate disparities in resource adequacy between schools. This will not only address sound planning imperatives but also equality issues. Quality assurance and standards officers can be instrumental in this endeavor.

c) Need to mainstream educational practice of analyzing learning outcomes and linking the same to school inputs and other indicators so as to detect and avert patterns of biasness in school practices. Consequently, related studies can be conducted focusing on distribution of other school inputs or processes so as to assess their implication on equality of education opportunity in either public or private schools

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