JRIIE Journal of Research Innovation and Implications in Education
Center for Research Implications & Practice

Website: www.jriiejournal.com ISSN 2520-7504 (Online) Vol.10, Iss.4, 2026 (pp. 1187 - 1201)

Instructional Resources on Academic Performance of Learners in Integrated Science in Public Junior Secondary Schools in Busia County, Kenya

Makokha, Terry David
Moi University, School of Education,
Department of Curriculum, Instruction and Educational Media
P.O. Box 3900-30100, Eldoret
Email: makokhaterri@gmail.com

Abstract: *One pivotal cause of inadequate academic performance in Kenyan schools today is inability of the government to adequately provide learning resources to schools. In order for the Ministry of Education, Science, and Technology to implement free primary and subsidized secondary education and enhance the implementation of Competency Based Education, there is need to sufficiently supply resource materials to schools. The study sought to assess the influence of instructional resources on academic performance of learners in Integrated Science in public junior secondary schools in Busia County. The study was guided by Gagné's Theory of Five Conditions of Learning. Its philosophical paradigm was borrowed from the Pragmatic Worldview and embraced a convergent mixed-methods design. The target population was 5100 grade eight students and 157 teachers of integrated science from 56 public junior secondary schools in Busia County. Using stratified random sampling, 43 junior secondary schools were selected from which 357 learners and 49 teachers were randomly and purposively drawn respectively. Data collection was done using teacher questionnaire and document analysis guide. The quantitative data was analyzed using descriptive and inferential statistics while qualitative data was analyzed thematically. The study findings showed that instructional resources had a p-value (r=0.79, p=0.000) less than the alpha value of 0.05, indicating a positive significant correlation with the academic performance of learners in Integrated Science. Qualitative data findings revealed that majority of the teachers in junior secondary schools intended to transfer from rural schools to urban schools on the basis of availability of instructional resources. The study concluded that inadequacy of instructional resources influenced low academic performance in Integrated Science in the study area. The study thus recommended strategies that should increase academic performance in the subject as follows; school head teachers should provide adequate instructional resources and encourage teachers to improvise in the situations where instructional resources either lack or is inadequate, for effective teaching and learning achievement in Integrated Science.*

Keywords: *Influence, Instructional resources, Inadequate Academic Performance in Integrated Science*

How to cite this work (APA):

Makokha, T. D. (2026). Instructional Resources on Academic Performance of Learners in Integrated Science in Public Junior Secondary Schools in Busia County, Kenya. *Journal of Research Innovation and Implications in Education, 10*(4), 1187 – 1201. **https://doi.org/10.59765/vyr5y4q**

1. Introduction

Education remains the most outstanding development priority area in the world today. It is widely regarded as a basic human right, a key to enlightenment, and a source of wealth and power (Mugenda & Mugenda, 2019). Effective classroom instruction requires the interplay of teachers, instructional materials and proper instructional strategies. Teaching materials are instructional aids used in classroom instruction and in learning process. According to Owoko

(2010), the term resources refers not only to teaching methods and materials but also the time available for instruction, the knowledge and skills of teachers acquired through training and the years of experience. Chunk (2019), opined that teaching and learning resources include, among other things, teachers and teaching resources including classrooms, teacher manuals and powders, chalk scraps, sanitary facilities, and entertainment facilities. These resources promote effective instruction. According to Kenya's Ministry of Education, Science, and Technology (2019), adequacy of teaching resources has enabled more than 10 million school going children in both primary and secondary schools to be in schools and grasp abstract content taught. However, despite the increase in school enrollment, the Ministry of Education has continued to receive less funds from the government to purchase adequate textbooks, teacher manuals, resulting in limited resources which transcend to low academic performance in schools.

Chunk (2019) posited that the ratio of textbooks per pupil in developing countries remains high, 5:1, compared to a global standard of 2:1. The shortage of these vital instructional resources has compromised affective teaching and learning activities in such countries leading to low standards and subsequent quality of education in schools as well as overall poor academic performance. Rosenholtz (2019) strongly emphasized that teachers, irrespective of higher academic background would be unable to put ideas into practice if the school setting lacks the right and adequate equipment and materials necessary for translation of teacher competences into reality.

Sifuna (2018) opined that teachers need to have a supportive environment and resources to work effectively. Kinyanjui (2017) evaluated the differences in the distribution of educational resources between regions of Kenya and in the separation between rural and urban areas. The study found that schools in rich areas like cities have more teaching resources as compared to those in far flung rural areas which struggle to build school facilities, pay for transportation, and are more vulnerable to environmental disasters. Based on the afore-mentioned findings, students in rich schools have shown better academic prowess as compared to those in rural Kenya, Tanzania, and Uganda.

According to Ubogu (2014), a good learning environment, associated with smaller class sizes, results in better academic performance of learners as a result of better access to instructional resources. Clean air, good lighting, small, quiet, comfortable, and safety are the major indicators of a good and conducive learning environment, which is vital for student academic achievement. Several studies: Saad and Sankaran (2020) Twoli (2016); Livumbaze and Achoka (2017) and Wambua et al., (2018) have revealed existence of significant correlations between availability and adequacy of instructional resources and improved student academic performance.

The evidence from the current study area have shown a worrying trend in dismal academic performance occasioned by free primary and subsidized secondary education. This has been compounded by the challenges associated with the implementation of Competency Based Education (CBE), particularly due to increasing enrolment in primary schools and inadequate funding in schools. Limited studies have been carried out in the study site to correlate the influence of instructional resources on academic performance in schools. It is imperative to find out the underlining aspects that have contributed to this trend of low learning achievement. The current study therefore endeavors to fill the knowledge gaps by investigating the influence of teaching and learning resources on students' academic performance in Integrated Science in public junior secondary schools in Busia County.

1.1 Statement of the Problem

There has been a worrying trend over recent years that students in public junior secondary schools in Busia County have continued to perform poorly in both formative and summative examinations as compared to other neighboring counties. This downward trend is manifested particularly in Kenya Certificate of Basic Education (KCBE). The relevance of Kenya Junior Secondary Examination and Assessment (KJSEA) in students' academic journey in securing good secondary schools cannot be underrated.

Despite the importance associated with KJSEA, students still perform poorly in schools and it's now becoming a great concern to society as well as the relevant education stakeholders. The poor academic performance in Integrated Science has resulted to majority of the learners failing to secure vacancies in prime national and extra county senior schools and only manage dismally performing local sub county secondary schools. The current study endeavored to explore how student academic performance in Integrated Science is influenced in the intricate dynamics of inadequate instructional resources in public junior secondary schools in Busia County. This was done with a view of establishing the possible measures that should be considered in mitigating the gap that exists between teacher instructional resources and academic performance of learners in public junior secondary schools

1.2 Research Objective

The study sought to assess the influence of instructional resources on academic performance of learners in Integrated Science in public junior secondary schools.

2. Literature Review

2.1 Concept of Students' Academic Performance

De Jager and Gbadamosi (2010) defined academic performance as the change that occurs after an individual has undergone training or planned experience, particularly with regard to individual behavior, knowledge or skills. He further stated that academic performance relates to students' achievement and success in their course of study. In this study, academic performance is construed to imply the process of students' acquisition of knowledge in Integrated Science

Student academic performance is reflected in a broad array of outcome measures, including attendance, participation, engagement, and motivation (Harris, 2014). It is the growth in subject-matter knowledge, understanding, and skills over time (Guskey, 2013). Essentially, it is an improvement in academic achievement that constitutes learning. Based on this notion of learning as growth is changing over time. Knowing whether student learning has occurred requires tracking the growth in what the learner knows and can do. It is only through comparison of learner's content mastery at successive points in time that the nature and extent of learning can be gauged (Marzano et al., 2015).

Aduda (2009) linked students' academic performance to effectiveness in thinking or task performance and described it as the ability of the individual to be productive after formal or planned experience. This effectiveness can be exhibited in individual behavior, knowledge or skill, thus depicted as that which can be observed after training. According to Marzano et al., (2013), academic performance reflects the quality of education of a country. Recent studies carried out in America and Asia by UNICEF in 2016 reveals most school going children are unable to read and write. The studies also established that in several countries, students' academic performance is still too low. UIS (2013) had also opined that millions of children in primary schools were illiterate, half of which were found in Sub-Saharan Africa. Indeed, research on West African countries indicates that governmental policies on education do influence student academic performance. The study done on three East African Countries; Tanzania, Uganda and Kenya by UNESCO (2015), offered a snapshot and a useful indicator of student academic performance in the region.

The Government of Kenya Economic Recovery Strategy for Wealth and Employment Creation (2003-2008), a blueprint on education recommends that education is meant to provide an exit route from poverty. In achieving these targets, the education stakeholders play a key role of ensuring quality instruction at all levels of the education system aimed at the attainment of literacy and numeracy through effective instructional processes and enhanced student learning outcomes (UNESCO, 2015). An existing gap in reviewed literature was failure of earlier studies to appropriately relate the influence the instructional resources had on the student academic performance in schools, a move the current study endeavors to.

2.2 Students' Learning Achievement in Integrated Science

According to Kenya Literature Bureau (2018), Integrated Science is a multi-disciplinary science that comprises Biology, Chemistry and Physics. The modern propensity towards multi-disciplinary research and the alignment of scientific knowledge from different fields has resulted in significant overlap of the field of Integrated Science with other scientific disciplines. Modern principles of other fields such as Chemistry, Medicine, and Physics, for instance are integrated with those of Biology in areas such as Biochemistry, Biomedicine, and Biophysics, making Integrated Science a valuable subject to humankind. In this respect, therefore, the Kenya Institute of Curriculum Development, KICD (2021) emphasizes the significance of studying this valuable subject to human society. In recent years however, in spite of the afore-mentioned benefits Integrated Science avails to its students, learning achievement in this subject since the commencement of Competency Based Education, in public junior secondary schools in Busia County has been dwindling. Abdiaziz (2019) revealed that inadequate instructional resources, poor teaching methods and unsuitable learning environment were among the main factors contributing to the dismal learning achievement in Integrated Science countrywide.

2.3 Effective Teaching of Integrated Science in Junior Secondary Schools in Kenya

Academic performance being an outcome of classroom instruction emphasizes well developed and carefully planned lessons (Okwuduba & Okigbo, 2018). The lessons in Integrated Science ought to provide small learning increments and clearly defined and prescribed teaching tasks (Njagi, 2014). The lessons should be based on the theory that clear instruction eliminates misinterpretation and greatly improves and accelerates learning. It requires new pedagogical skills that are all inclusive learner centered. The subject ought to be taught properly by competent, knowledgeable and experienced teachers embracing suitable instructional methodologies and using appropriate and adequate instructional materials.

.

KICD (2021) recommends instructional strategies in Integrated Science to be designed to facilitate learning process with the teacher deliberately providing guiding experiences. This allows learners to experience learning through common activities that allow them to build on prior

knowledge. According to Busia County SMASSE Inset (2019), the teacher of Integrated Science's key role during the instructional process is to monitor the learners' exploration of content by guiding their inquiry and promoting new patterns of thinking in a systematic way. Okwuduba and Okigbo (2018) state that instructional methods in Integrated Science should be geared towards objective-oriented activities where there is flow of information between teachers and learners. Knowledge on pedagogy is important as instructional methods influence different types of learning outcomes in the cognitive, affective and psychomotor domains (Yang et al., 2015). According to UNESCO (2016), the choice of teaching methods in Integrated Science is dependent on the kind of teaching preferred and the heuristic approach preferred.

In accordance with Arunga (2015), KICD further puts a lot of emphasis on the teaching approaches that are inductive and heuristic in nature, where classroom instruction commences with observations then leads to collection of experimental data to interpret the problem being solved. In this learner-centered approach to instruction, teachers and students play an equally active role in the learning process (Okwuduba & Okigbo, 2018). The approach stipulates that the Integrated Science teacher's primary role is to guide and facilitate learning process and not the sole source of information (Ashman, 2015). According to Ubogu (2014), a good learning environment, associated with smaller class sizes, results in better academic learners' performance as a result of better access to instructional resources. Clean air, good lighting, small, quiet, comfortable, and safety are the major indicators and ingredients of a good and conducive learning environment.

2.4 Concept of Teaching and Learning Resources in Sciences

Adequacy of teaching and learning resources refers to satisfactory or acceptable quality and quantities of material resources, physical facilities and human resources. Several studies: Saad and Sankaran (2020) Twoli (2016); Livumbaze and Achoka (2017) and Wambua et al., (2018) have shown existence of various correlations between availability and adequacy of instructional resources and improved student academic performance. Adequacy of relevant instructional materials such as textbooks, which is the main instruction material is the most cost effective input affecting student performance. In this context adequate supply is usually assumed to be a minimum of one textbook per three students, and at primary level enough reading books so that every child has access and the opportunity to read at least one new book every week.

Adequacy of teaching and learning resources determines an educational system's efficiency (Padmanabhan, 2017). For effective teaching and learning, textbooks and other relevant resource materials are ideal and basic tools, whose absence or inadequacy makes teachers handle subjects in an abstract manner, portraying it as a dry and non-exciting learning experience. It is also important, according to Ubogu (2014), to have appropriate personnel plan for adequate instructional materials and physical facilities to support educational effort. Therefore, Scarcity of textbooks, libraries and physical facilities according to Wambua et al., (2018), will constrain any educational system from responding more fully to new demands. In order to raise the quality of education, its efficiency and productivity, better learning materials, physical facilities and human resources are essential.

2.5 School Physical Conditions and Learner's Academic Performance

According to Ijaduola (2007), school physical conditions refer to things that enable the teacher and students to carry out teaching and learning process effectively. Firestone and Pennell (2012) opined that the school physical facilities, infrastructure, site and space are very necessary in ensuring the effectiveness and efficiency of the school activities as an instructional system.

The Kenya Ministry of Education Policy (2013) further recommends that the school physical conditions ought to be made available and conducive to facilitate and enhance the learning process. The policy stipulates that classrooms, laboratories and libraries should be adequate, well-constructed and spacious. Besides, there is need for provision of playing grounds, toilets and staff rooms for effective teaching and learning processes. In this study, the school physical conditions are understood to mean setting influenced by a variety of variables such as availability of teaching/ learning resources, principal support, students' attitude towards learning and instructional strategies employed by teachers. According to IOL News (2017), school physical conditions can be a very strong incentive for a teacher to seek transfer or alternative employment opportunities elsewhere. Moreover, teachers working in schools with unavailable or inadequate physical conditions tend to feel less valued and are more prone to seek transfer or leave their job position (Firestone & Pennell, 2012; Hansen & Corcoran, 2014).

Lyons (2012) argued that learning, being a complex activity involving interplay of students' motivation, teaching skills and curriculum demands, requires adequate supply of physical facilities and teaching resources. The study adds that availability of teaching and learning resources enhances the effectiveness of schools as they are the basic resources that bring about good academic performance. Provision of good physical facilities in schools significantly promotes students' academic performance. For instance, studies by Hansen and Corcoran (2014) have linked size and adequacy of classrooms, and availability of instructional material resources to high students' learning achievement in

sciences. In particular, availability, relevance and adequacy of school physical conditions have been associated with helping in providing the learners with the desired education and attracting them towards the different school programs. Similarly, studies by Ajayi and Emoruwa (2012) have established a positive correlation between school physical conditions and student learning achievement. The school physical conditions go hand in hand with instructional materials for effective classroom instruction.

2.6 School Instructional Resources and Learners' Academic Performance

Teaching and learning resources comprises basically three components: material resources, that is, textbooks, charts, maps, audiovisual and electronic instructional materials such as radio, tape recorder, television and video tape recorder. Other categories of material resources consist of paper supplies and writing materials such as pens, eraser, exercise books, crayon, chalk drawing books, notebooks, pencil, ruler, slate, workbooks and so on (Atkinson, 2010), physical facilities and human resources. Studies done in the past with regard to availability of teaching and learning resources in education reveal that these instructional resources are not always available or adequate in schools.

According to Obanya (1989), instructional materials are viewed as didactic material things which are supposed to make learning and teaching possible. Abdullahi (2010) considers instructional materials as locally made or imported teaching resources that could make tremendous enhancement of lesson impact if intelligently used. In similar view, Ikerionwu and Isola (2015) referred to them as objects or devices, which help the teacher to make a lesson much clearer to the learner. They are, according to Agina-obu (2015), concrete or physical objects which provide sound, visual or both to the sense organs during the teaching process thus enhancing the learning achievement.

Scholars have discovered a very strong positive significant relationship between instructional resources and academic performance. According to Sifuna (2015), schools endowed with more materials performed better than schools that are less endowed. This corroborated the study by Wambua and Murungi (2018) who argued that private schools performed better than public schools because of the availability and adequacy of instructional resources. Such schools, according to Wambugu, and Busienei, (2017) show minimal teacher turnover intentions. Mwiria (2015) also supports that students' performance is affected by the quality and quantity of teaching and learning materials. This inadequacy of teaching and learning resources has been of serious concern to educators.

Provision of good physical facilities in schools significantly promotes students' academic performance. For instance, study by Hansen and Corcoran (2014) linked size of classrooms and availability of instructional material resources to high students' learning achievement in sciences. In particular, availability, relevance and adequacy of school physical conditions have been associated with helping in providing the learners with the desired education and attracting them towards the different school programs. Similarly, studies by Ajayi (2012) and Hallack (2010) have established a positive correlation between school physical conditions and teaching resources, enhanced student learning achievement.

Saad and Sankaran (2020) opine that instructional resources equip students with vital knowledge and skills essential in problem-solving and critical analytical thinking. The study further established that availability and adequacy of resource materials is key in bringing positive changes to the academic development of students. Syomwene et al. (2016) further expound that teachers when teaching should incorporate instructional resources that are various, arouse interest in learners, are relevant and adequate to cater for the learners' educational needs. Wambua et al., (2018) opine that lack of or inadequacy supply of instructional resources lead to abstract instruction exhibited by passive learning which ultimately transcends to poor academic performance.

Twoli (2016) argued that textbooks enable the learners to follow the teacher's sequence of presentation and aids in understanding of lessons. It is further supported by findings of Ubogu (2014) who opined that resources not only provide concrete experiences but also assist students to integrate prior experiences with new learning hence aid in understanding. According to study by Isola (2013), the adequacy and use of relevant teaching and learning materials affect the effectiveness of a teacher's lesson delivery. Livumbaze and Achoka (2017), in addition suggested that underperforming schools need to be provided with adequate learning and teaching resources and build essential physical infrastructure to improve their academic performance. A few studies have shown that material resources have a significant effect on students' academic achievement since they facilitate the learning of abstract concepts and ideas and discourage rote-learning. When teaching and learning resources are inadequate in schools, education is compromised and this inevitably is reflected in low academic achievement, high dropout rates and unmet educational goals. The current study vividly aims at assessing the influence of instructional resources on academic performance of learners in Integrated Science in public junior secondary schools and filling the gaps that may exist between the independent and the dependent variables.

Research Hypothesis

H_{01} There is no statistically significant relationship between the instructional resources and the learners'

academic performance in Integrated Science in public junior secondary schools.

3. Methodology

In order to address the research objective, the study adopted the methodology expounded in this section. The study embraced a Pragmatic Worldview whose philosophy arises out of actions, situations, and is concerned with what works and solutions to problems (Patton, 2013). Pragmatism is applicable to this study because it is a philosophical underpinning for mixed methods studies (Tashakkori & Teddlie, 2010). According to Saunders et al. (2012) and Wilson (2010) (as cited in Maswoswere, 2019), pragmatists argue that there are numerous different ways of learning and understanding because there are multiple realities. According to Rossman (2012) and Cherryholmes (2013), instead of focusing on single method, researchers ought to emphasize the research problem and use all possible approaches available to have an in depth understanding of the problem. To this end, the study further employed a convergent mixed methods design as illustrated below.

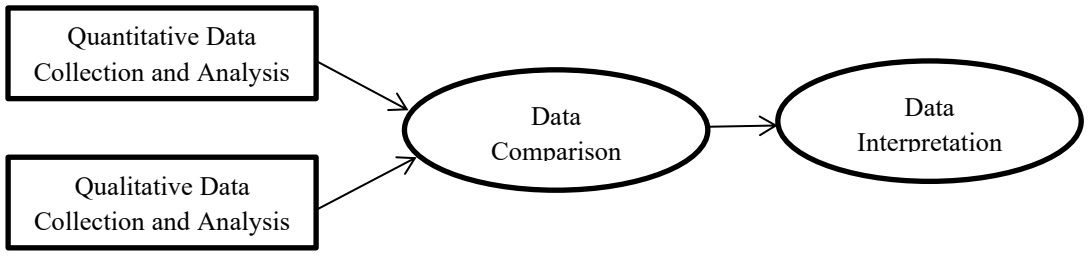


Figure 1: Convergent Research Design

Source: Creswell & Creswell, 2023

The convergent mixed methods design appropriately suited this study because it enabled the researcher to have across the board understanding of the study topic, had limited time, needed both quantitative and qualitative information to extensively understand the study topic, and had adequate required skills to handle both quantitative and qualitative research methods (Creswell & Creswell 2023).

The study was conducted in Busia County, located in what was formerly known as Western Province. The Counties of Bungoma, Kakamega, Siaya and the Republic of Uganda border this County. This site was specifically selected because the learners' academic performance in Integrated Science since the inception of Competency Based Education has been far much below the education stakeholders' expectations. In accordance with Abdiaziz (2019), the public secondary schools in Busia County, just like any other marginalized counties are characterized by low teacher-students ration, inadequate physical facilities, poor roads, ethnicity, and highest percentage of poverty and teacher turnover intentions.

According to Bryman and Bell (2014), the power of purposive sampling lies in selecting information rich cases for in–depth analysis related to the central issue being studied. In view of this, and besides the teachers of Integrated Science, grade eight students in their third trimester were considered in the study to ensure the participation of learners who have been exposed to both grade seven and grade eight Integrated Science content, which is about 70% of the junior secondary school Competency Based Curriculum. Besides, grade nine learners are busy preparing for their last exam in junior secondary and teachers give them a lot of attention at the expense of grade eight and the other lower grades.

Table 1: Target Population and Sample Size

Respondents	Target Population	Sample	Percentage
Teachers of Science	157	49	31.2 %
Grade 8 Learners	5100	357	07.0 %
Total	5257	406	

Source: Field Data, 2026

The grade eight learners' sample size estimation from the target population is in agreement with Krejcie and Morgan Formula of sample size determination as shown below;

$$n = \frac{X^2 * N * P * (1-P)}{(ME^2 * (N-1)) + (X^2 * P * (1-P))}$$

Where :

n = sample size

X^2 = Chi – square for the specified confider

N = Population Size

P = population proportion (.50 in this table)

ME = desired Margin of Error (expressed as

$$n = \frac{1.96^2 \times 5100 \times 0.5 \times 0.5}{0.05^2 \times 5099 + 1.96^2 \times 0.5 \times 0.5} = \frac{4898.04}{12.7475 + 0.9604} = \frac{4898.04}{13.7079} = 357$$

To this end, a total sample of *406* participants was obtained for the study and comprised 49 teachers of Integrated Science and 357 grade eight learners. The total sample size of *406* is in agreement with recommendations of Sample Size Determination Table proposed by Fowler (2009) as shown below;

Table 2. Sample Size Table

	Size of population					
Margin of error	**>5000**	**5000**	**2500**	**1000**	**500**	**200**
±10%	96	94	93	88	81	65
±7.5%	171	165	160	146	127	92
±5%	384	357	333	278	217	132
±3%	1067	880	748	516	341	169

Source: Fowler F.J., 2009

Both the teacher questionnaire and document analysis guide were used to generate detailed data relating to influence of instructional resources on student academic performance in Integrated Science. In every sampled school, all the teachers currently teaching Integrated Science in grade eight were purposively selected irrespective of the number of grade eight streams a school had. On the other hand, systematic random sampling technique was used to select 8 learners from every sampled school who were arranged according to their admission numbers in ascending order and thereafter students in even positions selected. Similarly, stratified random sampling technique with proportionate allocation was used to select 12 students in three schools that had larger population of more than 70 grade eight learners. This aimed at choosing sample sizes that were proportionate to the size of sample unit in order to increase the chances of representativeness (Orodho et al., 2016). This view is in line with Lauren's (2020) definition of stratified sampling as being a random selection of strata within the target population.

The collected data was accurately scored and systematically organized into units to facilitate data analysis (Gay et al., 2006). Data from the teacher questionnaire was analyzed and presented by descriptive and inferential statistics first using Pearson Product Moment Correlation and then Multiple Linear Regressions as depicted in the next section. According to Kumari and Yadav (2018), multiple linear regressions is a statistical method used to model the relationship between two or more predictor variables and a response variable.

Ethical Considerations

Ethics in research entails confidentiality, anonymity, volunteerism and appropriateness of researcher's behavior as relates to the rights and safety of respondents (Orodho et al., 2016). In line with the current study, the researcher sought permission from the National Council of Science, Technology and Innovations (NACOSTI) to conduct research in the selected sample junior secondary schools in Busia County, a study site selected without the researcher's prior vested interest. According to the recommendations of Creswell and Creswell (2018), selection of study site with researcher's vested interest is a breach of research ethics.

During the research process, anonymity of study participants and confidentiality of the information obtained were given high priority. The questionnaires were designed such that the respondents did not have to indicate their names (Bryman 2004; Gay et al., 2006). Moreover, the schools from which the data were generated remain undisclosed and the collected data were used for academic purposes only.

Prior to data collection process, the participants were thoroughly informed about the study purpose before the research instruments were distributed for them to make informed consent (Creswell, 2014). This was done to refrain the researcher from pressurizing the participants thus ensuring that participation in the study was purely voluntary. The researcher purposely strove for honesty in all communications, avoided plagiarism and honestly collected data, analyzed it and reported the true data results and conclusions.

4. Results and Discussion

Since the instructional process in Integrated Science goes on in a school setting, an analysis of the influence of instructional resources on academic performance in the subject was inevitable. To address the study objective, the questionnaire items 1-10 were combined to form one variable; "school instructional resources". Both the descriptive and the inferential statistics were employed to analyze the quantitative data obtained. The descriptive statistical analysis using a five-point Likert scale was employed where; Strongly Disagree=1, Disagree=2, Undecided=3, Agree=4 and Strongly Agree=5.

The researcher was keen in finding out whether there was any relationship between school instructional resources and students' academic performance in Integrated Science. To this end, inferential statistics using Pearson Product Moment Correlation Coefficient (r) was employed. Table 3 shows how the teachers of Integrated Science from public junior secondary schools in Busia County responded to the questions.

Table 3. Influence of instructional Resource on Students' Academic Performance in Integrated Science

	Statements	SD (%)	D (%)	U (%)	A (%)	SA (%)	M	SD
1.	My school has adequate Playgrounds	20(40.8)	22(44.9)	1(2.0)	4(8.2)	2(4.1)	1.89	1.15
2.	My school has adequate washrooms	21(42.9)	9(38.8)	5(10.2)	4(8.2)	0(0.0)	1.79	0.92
3.	My school has adequate classrooms	15(30.6)	18(36.7)	3(6.1)	9(18.4)	4(8.2)	2.16	1.30
4.	My school has adequate reference books	17(34.7)	23(46.9)	2(4.1)	6(12.2)	1(2.0)	2.04	1.04
5.	My school has adequate whiteboards	18(36.7)	19(38.8)	6(12.2)	5(10.2)	1(2.0)	2.02	1.02
6.	My school has adequate lab & equip.	14(28.6)	17(34.7)	7(14.3)	9(18.4)	2(4.1)	2.36	1.20
7.	My school has adequate & library	18(36.7)	21(42.9)	5(10.2)	3(6.1)	1(2.0)	1.88	.97
8.	My school has adequate clean water& electricity	20(40.8)	21(42.9)	2(4.1)	4(8.2)	2(4.1)	1.93	.98
9.	My principal supports my instructional needs	17(34.7)	14(28.9)	8(16.3)	7(14.3)	3(6.1)	2.06	1.25
10.	My principal allows for my instructional independency	16(32.7)	18(36.7)	7(14.3)	7(14.3)	1(2.0)	2.08	1.08
	Average Mean & SD						**2.02**	**1.09**

Source: Research Data, 2026

Legend: SD=*Strongly Disagree***, *** **D=***Disagree*, ***U***=*Undecided*, ***A***=*Agree*, ***SA***=*Strongly Agree*
*Mean=**M**, Standard Deviation=**SD.***

The items under the study objective sought to analyze how the instructional resources influenced academic performance in Integrated Science in public junior secondary schools in Busia County. To ascertain this, the researcher analyzed various aspects of school instructional resources.

The study examined the availability and adequacy of the schools' playgrounds, washrooms and classrooms under the institutional physical infrastructure. From the descriptive statistics shown in Table 3, the results indicate that 42(85.7%) of the teachers disagreed that their schools did not have adequate playgrounds for learners' recreational activities which enhance learning environment in Integrated Science. Only 6(12.3%) of teachers agreed while 1(2.0%) were undecided. The mean rating for this item was 1.89 and had a standard deviation of 1.15 implying that majority of teachers of Integrated Science in public junior secondary schools in Busia County believed that academic performance in their subject was low due to most learning institutions lacking adequate recreational facilities. These facilities are basic need for learner development of social attributes and learning skills hence should be availed to encourage proactive activities.

Secondly, on availability and adequacy of both learners' and teachers' washrooms in schools, the descriptive results indicate that majority of the teachers of Integrated Science; 40(81.7%) disagreed on adequacy of the facility while only 4(8.2%) agreed with 5(10.2%) expressing indecision. This item had a mean rating of 1.79 and standard deviation of 0.92 implying that majority of the teachers believed that academic performance in Integrated Science was low because most of the schools in the study site did not have adequate washrooms which besides being essential in provision of a conducive learning environment, demonstrate the school values, cleanliness, hygiene and well- being of both teachers and learners, a recipe for enhanced instructional process.

Classrooms are important for Integrated Science instruction. On whether schools had adequate classrooms, the results indicate that 33(67.3%) of the teachers of Integrated Science disagreed that although the Kenyan government through CDF and some other non-governmental organizations had constructed classrooms in some schools in the region, they were far from adequate. Only a paltry 13(26.6%) of the teachers agreed while 3(6.1%) were undecided. The item had a mean rating of 2.16 and a standard deviation of 1.30 implying that learning achievement in Integrated Science in public junior secondary schools in Busia County was jeopardized as a result of schools lacking adequate classrooms which provide best educational space and instructional site. Inadequate classrooms therefore resulted to overpopulated and congested classes.

When asked whether their schools had libraries, majority of the teachers represented by 39(79.6%) affirmed that most of the schools in the County lacked libraries (Mean=1.88, SD=0.97). This implies that most of the learners did not have special rooms where adequate reference materials in Integrated Science could be kept and also quiet places, ideal for individualized studies. Lack of such important resource in schools impinges on the teaching and learning process in Integrated Science leading to low scores since learners lacked access to reference materials where they could refer to or conduct thorough research on their own.

The researcher was also interested in establishing how far school physical conditions influence the students' learning achievement in Integrated Science. Studies have shown that when schools' physical infrastructures are unavailable or inadequate, student academic performance deteriorates due to low morale and a feeling of inadequacy. The current study's finding on influence of schools' physical infrastructures on learning achievement is supported by available literature from various scholars; Ijaduola (2007), Firestone and Pennell (2012) and IOL News (2017). These studies indicate that conducive school physical facilities are essential resources in enabling the teacher and students carry out the teaching and learning process effectively. The results also agree with the views of researchers; Gatsinzi and Makewa (2014), Rosenholtz (2019) and Cottini et al. (2011) who found a significant relationship between unpleasant school workplace conditions and ineffective classroom instruction, considered perfect ingredients to low students' academic performance.

Additionally, the study findings are in congruence with those of Lyons (2012) who posited that learning being a complex activity requires the provision of adequate supply of physical facilities suitable in enhancing the effectiveness of the instructional process in order to bring about the desired academic performance among students. The findings as well confirms the recommendations made by studies of Corcoran (2014) and Livumbaze and Achoka (2017) which linked the size and adequacy of classrooms with improved student learning achievement. The study findings also substantiate the views of the above two scholars which postulated that overpopulated classes result in straining of teachers as they move about during the instructional process, giving individualized attention to learners needing additional support, effectively managing their classes and getting all learners to participate in lessons. Finally, IOL News (2017) posit that a teacher becomes less innovative and creative due to low intrinsic motivation resulting from straining in unpleasant work atmosphere. The current study established a positive correlation between school physical infrastructure and student academic performance in Integrated Science.

The descriptive results also indicate that majority of the teachers 40(81.6%) disagreed that their schools had adequate course and reference books for Integrated Science instructional process. Only 7(14.2%) of respondents agreed while 2(4.1%) remained undecided. This item had a mean rating of 2.04 and a standard deviation of 1.04 indicating that most teachers of this subject associated low academic performance in the subject as a result of unavailability of instructional books in the subject which affects the teaching

and learning process by providing clarification, revision or further exploration. In some schools both course and reference books were completely unavailable, inadequate, outdated or torn.

More so, when asked whether their schools had adequate Integrated Science charts and models, the statistical results show that majority of the teachers; 37(75.6%) disagreed while 6(12.2%) agreed. However, 6(12.2%) were undecided. The item had a mean of 2.02 and a standard deviation of 1.04 implying that majority of teachers of Integrated Science from public junior secondary schools in the study area associated low academic performance in the subject with inadequacy of charts and models which are essential tools in the subject's instructional process. Science charts and models are known to link abstract concepts theoretically learned to a three-dimensional practical aspect hence enhancing the concept of comprehension, and content retention especially in the subject under study.

Moreover, on the availability and adequacy of laboratories, laboratory equipment and reagents schools, the results indicate that 31(63.2%) of the teachers disagreed while 11(22.5%) agreed. However, a small percentage of teachers 7(14.3%) were undecided. This item had a mean rating and standard deviation of 2.36 and 1.20 respectively indicating that majority of public junior secondary school teachers of Integrated Science in Busia County implied that learning achievement in Integrated Science was low because most schools lacked the afore-mentioned resources which are essential for teaching practical concepts in the subject. Currently, KICD espouses the teaching of sciences in Kenyan schools by aligning theoretical knowledge to practical activities to improve learning achievements in those subjects. The above findings are authenticated by the data collected using the Document Analysis Guide, where records revealed that some schools due to unavailability of laboratories, their learners occasionally had to walk long distances to neighboring schools to carry out Integrated Science practical lessons. Unavailability or inadequacies in instructional resources in schools affect the effectiveness of teachers in the subject's instructional process.

The study findings contrast the suggestions of Obanya (1989); Abdullahi (2010); Ikerionwu and Isola (2015) and Agina-obu (2015) who viewed instructional materials as didactic material things which are supposed to make learning and teaching possible. They opined that instructional materials are locally made or imported teaching resources that could make tremendous enhancement of lesson impact if intelligently used. According to the scholars, instructional materials are objects or devices which help the teachers to make lessons much clearer to the learner. They are, according to above scholars, concrete or physical objects which provide sound, visual or both to the sense organs during the instructional process thus enhancing student academic performance. In same vein, Saad and Sankaran (2020) revealed that instructional resources are very important in learning of Integrated Science by equipping the students with vital knowledge and skills essential in problem-solving and critical analytical thinking. Teachers ought to incorporate instructional resources that are various, arouse interest in learners, and are relevant and adequate to cater for the learners' educational needs.

Additionally, the current study findings on instructional materials as well contrast the reviewed literature and the suggestions of Twoli (2016) which argued that instructional resources such as text books enable the learners to follow the teacher's sequence of presentation and aids in understanding of lessons. The study results are further supported by opinions of Ubogu (2014) who showed that resources not only provide concrete experiences, but also help students to integrate prior experiences with new learning hence aid in understanding the concepts taught. The findings are inconsistent with the suggestions of Lyons (2012), Hansen and Corcoran (2014) and Livumbaze and Achoka (2017) which showed that the adequacy and consistent use of teaching and learning materials impacts on the effectiveness of a teacher's lesson delivery and transcends to improved student learning achievement.

The findings as well contradict the study by Wambua et al. (2018) that illustrated that inadequacy of instructional resources lead to abstract instruction exhibited by passive learning which ultimately results to low learning achievement. According to the opinions of Isola (2013, teaching/ learning resources simplify or clarify certain concepts or principles which would otherwise appear abstract. Rosenholtz (2019) posited that even highly qualified and experienced teachers would be unable to put their ideas into practice if their school setting did not have the adequate infrastructure, the appropriate equipment and right materials necessary for the translation of teacher competences into reality.

The study findings also indicate that 41(83.7%) of the teachers of Integrated Science disagreed on whether their schools had access to clean and reliable electricity (Mean=1.93, SD=0.98). Lack of such basic needs makes teachers in such institutions unsettled and uncomfortable in their stay and will spend a lot of their time in search of these essential commodities at the expense of engaging themselves fully in teaching process. The finding on unavailability of clean and reliable water supply in schools in study area contravenes the recommendations of UNICEF and WHO Joint Monitoring Program (2018) which demonstrated that the school going children exposed to clean surrounding and basic facilities learn better. The findings are also inconsistent with the suggestions of UNICEF and WHO (2018) that advocated for schools' access to safe drinking water as an essential ingredient to

learners' health. Moreover, the study results contradict the reviewed literature; Obura (2018) who indicated that provision of safe drinking water to learners reduce sanitation related diseases and improve their health and retention in schools.

In same vein, lack of electricity in learning institutions as evidenced by the study results is unfortunate due to the multiple services it can provide in the classroom. This finding is contrary to the study by Kuo (2017) which stated that lighting as a result of electricity can enable children in classes to be taught both early in the morning and late at night. Besides electric current can facilitate the integration of ICT into Science classroom teaching, which according to the study arouses interest in learners, makes learning enjoyable and enhances students' learning achievement in the subject. Finally, the study finding on lack of electricity in the most of the schools in the study site contradicts the recommendations of Berger and Fisher (2013) which correlated the major impact of electrification to reducing illiteracy and improving the quality of education. According to the study, school illumination reduces fatigue enabling students to study at more flexible hours, and potentially for longer.

The study as well used the Document Analysis Guide to corroborate the information collected using the Integrated Science Teachers' Questionnaire. The researcher was interested in analyzing particularly the teachers' transfer requests. The records obtained from the majority of rural bound schools were blotted with transfer requests of teachers dating as early as 2012 intending to be transferred to urban schools which were perceived to have adequate instructional materials. The documents also indicated that majority of the teachers intending to transfer had quoted unavailability of conducive learning environment as the main reason they wished to be transferred.

The study results also indicate that a significant number of the teachers; 31(63.6%) disagreed regarding administrative support for availing Integrated Science instructional materials while only 10(20.4%) agreed. This item had a mean rating of 2.06 and standard deviation of 1.25 implying that majority of Integrated Science teachers in Busia County doubted if their school administrators offered them adequate support essential in Integrated Science classroom instructional process, and also on matters concerning learners' discipline. School heads play key roles in enhancing quality instruction in their schools by ensuring that education policies are adhered to and teaching strategies are in place that support effective learning. They serve as facilitators, guides and supporters of quality instructional practices. Therefore, the contrary perception from the teachers goes against this principle and is therefore bound to demoralize them and infringe on their efficiency in curriculum implementation leading to low academic performance.

The study findings regarding the administrative support in Integrated Science classroom instructional needs confirm the earlier work of Shuck et al. (2011) that revealed that teachers' commitment and productivity varied according to the school leadership styles and administrative support. The results as well contravene the views of Thibodeaux et al. (2015) which stated that the principals' leadership styles play crucial roles in the retention of teachers for Integrated Science instructional consistence which is essential for improved learning outcome. When teachers believe that their school managers are unwilling to listen and respond to their needs, their morale in teaching is diminished, their efforts reduced, and this affects the learners' scores. The finding also contradicts the views of Muasya (2018) which opined that instructional leadership practices from the school heads are strongly and directly associated with student academic performance. The findings are inconsistent with the suggestions of other studies, as reviewed in the literature; Leithwood et al. (2016) and Day et al. (2016) which purported that the principal's leadership style is the second influencer on student learning achievement besides classroom instructional strategies. The two studies revealed that principal's supervisory role of reviewing teachers' lesson notes, offering support and guidance, and assessing them in class positively and significantly relates to enhanced student learning achievement.

Equally, the study results share the same sentiments as opinions of Leithwood et al. (2016) and Day et al. (2016) that explained that school heads ought to concentrate their efforts and energies in promoting enhanced student learning achievements in their institutions through transformational leadership that strives to establish institutional culture and vision aimed at enhancing teaching and learning quality. Additionally, the findings do not support the views of Bass & Avolio (2014) which stressed that transformative school heads stimulate and inspire teachers to achieve the highest academic performance through leadership and provision of suitable learning environment ideal for teaching and learning of Biology. The study results however, disconfirm the findings of Chowdhury (2015) that revealed negative insignificant association between school leadership styles and students' learning achievement.

The final item under the objective of the study sought to find out whether the school principals in study site incorporated the ideas of teachers of Integrated Science in school decision making process regarding school policies on instructional process and student discipline. The statistics from Table 3 above indicate that majority of the teachers 34(69.7%) disagreed. Only a small fraction of the teachers 10(20.4 %) agreed while 5(10.2%) was non-committal. This is proven by statistical data representation of mean 2.22 and standard deviation 1.25. School heads creating opportunities for teachers to make decisions concerning learners' academic performance and school policies promotes the practice of doing the right thing and the feeling

of responsibility. On the other hand, non-participation of teachers in issues pertaining school regulations and students' learning achievement and welfare as implied in this item denies them a sense of ownership in their school issues. Such teachers are likely to be hands off and develop "teach and go home" attitude, bound to negatively affect instructional process in schools culminating in low academic performance.

These results confirm the findings of May (2012), Pearson and Mooma (2015) and Crookes (2017) who postulated that education programs which limit teacher autonomy can create feelings of powerlessness, anxiety, and resentment. Equally, the findings conform to the study by Mayer et al. (2013), which asserted that teacher autonomy enhances student learning outcome, particularly through teacher's independency in the choice of instructional strategies, learning materials, students' evaluation as well as discipline. The study findings are also inconsistent with the reviewed studies in the literature that were indicative of the relationship between teacher autonomy and student academic performance. The study finding contrasts the views of Ata et al. (2015), Kabiri et al. (2018) and Alshumaimeri and Borg (2019) who asserted that autonomous teachers use evaluation criteria in gauging themselves and demonstrating high levels of instructional skills essential for improved student academic achievement.

The average mean for the influence of instructional resources on academic performance in Integrated Science is 2.02 with a standard deviation of 1.09. The implication of this statement is that instructional resources affected the efficiency and morale of teachers in the instructional process in junior secondary schools in Busia County thus influencing the academic performance

The researcher further conducted Pearson's Correlation Analysis to test the study hypothesis which stated:

H_{01} There is no statistically significant relationship between the instructional resources and the learners' academic performance in Integrated Science in public junior secondary schools.

The hypothesis was tested using Pearson Product Moment Correlation at an alpha level of 0.05 and degrees of freedom of 47 (49-2). The *p* value and *r* value were used to establish the relationship between the study variables. It was purposely done to determine the strength and direction of the relationship between the independent and the dependent variables. The study intended to establish whether there was any significant relationship between the instructional resources; Mean = 2.02, S.D = 1.09 and the academic performance in Integrated Science; Mean = 1.95, S.D = 0.879. The computation output is shown in Table 4 below.

Table 4. Pearson's Correlation Analysis between Instructional Resources and Academic Performance in Integrated Science

Correlations	Instructional Resources	Academic Performance	
Instructional Resources	Pearson Correlation	1	.79**
	Sig. (2-tailed)		.000
	N	49	49
Academic Performance	Pearson Correlation	.79**	1
	Sig. (2-tailed)	.000	
	N	49	49

From the Table 4, the observed results were r = 0.79 and p = 0.000. An R-value of 0.79 indicates a positive relationship between the instructional resources and the academic performance in Integrated Science (Cohen et al., 2017). The results imply that learning achievement in in Integrated Science in Busia County is influenced by the state of the instructional resources. The p-value, 0.000 is less than the alpha value of 0.05. Evidence is thus provided against the stated null hypothesis, which is consequently rejected in favor of the alternative hypothesis.

The study concludes that the instructional resources in the study area are significantly related to students' academic performance. It thus implies that adequate supply of instructional resources in public junior secondary schools would result in enhanced student academic performance in Integrated Science and vice versa. These findings are in congruence with the prepositions of Gagné's Theory of Five Conditions of Learning whose tenets strongly guided the study.

Finally, in order to establish the contribution of each predictor variable (various aspects of school instructional resources) to the variation in the response variable (learner's academic performance in Integrated Science), regression analysis was carried out and the results presented in Table 5.

Table 5: Regression Coefficients

Model	Variable	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	1.03	.225		4.637	.000
	Instructional Resources	.199	.176	.520	.969	.022

The general model equation from the results in Table 5 indicates learners academic performance based on instructional resources.

$$Y = 1.032 + .195X$$

Based on the study hypothesis:

H_{01} There is no statistically significant relationship between the instructional resources and the learners' academic performance in Integrated Science in public junior secondary schools.

(t (47) = 0.989, p = .022 < .05) is significant, the null hypothesis is thus rejected. The interpretation of this is that one unit change in school instructional resources would cause a significant change of .195 or 19.5 % in academic performance in Integrated Science.

Implications for Research and Practice

The study findings are necessary in creating awareness to the school administrators on the influence of instructional resources on students' academic performance and hence strive to improve teacher working conditions in their schools by either sourcing or encouraging teachers of science to improvise where funds lacked. Of particular interest were the schools found in far flung, remote and marginalized regions of the country which annually record a significantly low learning achievement that culminate into poor academic performance. Secondly, the findings will equally benefit policy makers, and all key education stakeholders concerned with efficient and effective learning in Integrated Science in schools with unconducive work conditions such as unavailability or inadequacy of instructional and physical infrastructure.

5. Conclusion and Recommendations

5.1 Conclusion

The study established a positive significant correlation between the instructional resources and academic performance in Integrated Science in public junior secondary schools in Busia County. This finding suggests that availability of instructional resources in learning institutions are significantly related to academic performance. This implies that unconducive school working conditions; including inadequacy of physical infrastructure and instructional resources was a common issue in most of the sampled secondary schools in the study site. These un-enabling conditions influenced both teachers' turnover intentions and low academic performance in Integrated Science among learners in study area. The departure of these experienced teachers from rural schools to urban schools as a result of unconducive work environment leaves classrooms without subject specialists which affect the instructional strategies in Integrated Science consequently leading to dismally academic performance.

5.2 Recommendations

1. The school administration should provide a suitable school work atmosphere that fosters enhanced learning achievement. As such, both physical infrastructure and instructional resources should be sourced and adequately provided to enhance instructional process in Integrated Science.

2. The school principals should demonstrate good leadership and allow teachers of Integrated Science instructional freedom. They should encourage teachers to improvise in situations where instructional resources either lack or is inadequate for enhanced instructional process in Integrated Science.

Acknowledgement

This work is a product of the effort of several actors: My sincere gratitude goes to the Almighty God for the countless blessings. Secondly my special appreciation goes to Moi University. Equally, I am greatly indebted, in a special way, and my heartfelt gratitude goes to my wife Mary Nakhungu and children; Vanessa, Terence, Reuel, Zawadi, Presley and Praise, whose love ignites in me the desire to persevere hard times, focus on the goal and stretch my abilities beyond any limit. They are my strength and the main reason I strive to be a better and productive individual. May the success of this study be a sense of their inspiration.

Declaration of Conflicting Interests

The author declares no potential conflicts of interest with regard to this study, its authorship, and/or publication of this article.

About the Author

Makokha Terry David holds a PhD in Education [Curriculum Studies] from Moi University. He has vast experience having served initially as a research scientist at Institute of Primate Research, Nairobi, under Schistosomiasis Department. He is an experienced Biology/ Chemistry teacher and a senior Chemistry examiner at the Kenya National Examination Council. His research interest focuses on the process of curriculum development, implementation and evaluation.

References

Abdiaziz, O. A. (2019). School based factors influencing implementation of competency- based curriculum in Garissa township sub-county. (Unpublished M.Ed. Thesis), University of Nairobi, Nairobi, Kenya.

Aloyo, P. (2015). The relationship between physical environment and academic achievement in public secondary schools in Nairobi city, Kenya. Semantic Scholar.

Arunga, H.N. (2015). The impact of SMASSE project on the teaching and learning of Biology in secondary schools: A case of Mombasa County, Kenya. (Unpublished project), Kenyatta University.

Cherryholmes, C. H. (2013). Notes on Pragmatism and Scientific Realism. *Educational Researcher*, 13–17.

Chunk, T. G. (2019). Increasing the use of student- centered pedagogies from moderate to high improves student learning and attitudes about science. CBE-Life Sciences Education, 15(1).

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education (8th Ed.).* Routledge Publishers, New York, USA

Cottini, E., Kato, T., & Niels, W.N. (2011). Adverse workplace conditions, high-involvement work practices and labor turnover: Evidence from Danish linked employer–employee data. *Labour Economics, 18*(6) 872-880.

Creswell W. J. & Creswell D J., (2018). Research design; qualitative, quantitative and mixed methods approaches (5th Ed.). Sage Publishers, New York, USA.

Daniele C. & Ville M. (2016). Causes of teachers turnover intentions in swedish schools. Dalama University Press, Sweden

Dawley, D., Houghton, J.D., & Bucklew, N.S. (2014). Perceived organizational support and turnover intention: the mediating effects of personal sacrifice and job fit. The Journal of Social Psychology, 150(3), 238-257.

Garcia E & Weiss E. (2019). The teacher shortage is real, large and growing, and worse than we thought. Economic Policy Institute; Saje Journals.

Gatsinzi, P., Jesse, R., & Makewa, L.N. (2014). Work related variables in teacher motivation Gasabo District, Rwanda. Journal of Education, 1(2), 262- 275.

Hu, S. (2015). Educational aspiration and postsecondary access and choice: Students in the urban, suburban and rural schools compared. Education Policy Analysis Archives, Vol11 (14). http://epaa.asu. /epaa/v//n14/.

KICD, (2021). *KCBE Integrated Science Syllabus 2021/2022*. Nairobi, Government Printers.

Kothari C. & Garge G. (2014). Research methodology; methods and techniques 3rd Ed.New Delhi, New Age International Publishers Kuo, L. (2017).

Leithwood, K., Day, C., Sammons, P., Harris, A., & Hopkins, D. (2016). *Seven strong claims about successful school leadership.* Nottingham: National College for School Leadership.

Livumbaze, A.G., & Achoka, J. (2017). Attendance and gender: impact on students' academic achievement in public secondary schools in Hamisi Sub-County, Kenya. DOI: 1012816/00 36069

Marzano, R. J., & Toth, M. D. (2013). *Teacher evaluation that makes a difference: A new model for teacher growth and student achievement*. Alexandria. VA: ACD.

Maswoswere, P. (2019). Re: What is pragmatism? Is it a suitable worldview for Mixed Methods research design? Retrieved from: https://www.researchgate.net/post/citation/download

Muasya, P.M. (2018). Influence of instructional leadership practices on academic performance in public secondary schools in Machakos County, Kenya.

Nyaga K. (2019. Sustainable WASH systems learning partnership: a water infrastructure audit of Kitui County. Oxford: University of Oxford.

Okwuduba, E., & Okigbo, E.C. (2018). Effect of teaching methods on students' academic performance in chemistry in Nigeria: meta-analytic review. *Bulgarian Journal of Science and Education Policy (BJSEP),* 12(2), 418-134.

Orodho J., A. Khatete I. & Magiraneza J.P., (2016) *Concise Statistics. An Illustrative Approach to Problem Solving,* Nairobi. Karezja Happy Land Enterprise

Rosenholtz, S. J. (2019). Workplace conditions that affect teacher quality and commitment: Implications for teacher induction programs. *Elementary School Journal*, *89*(4) 421-39.

Saad, N., & Sankaran, S. (2020). Technology proficiency in teaching and facilitating. DOI:10.1093/acrefore/9780190264093.013.591

Syomwene A., Nyandusi C. & Yungungu A., (2017) *Core Principles in Curriculum*. Utafiti Foundations, Eldoret Kenya

Twoli, N. W. (2016). Teaching secondary school Biology; A textbook for teachers in developing countries. Nehema Publishers, Nairobi.

UNESCO, (2016). Education for sustainable development. An expert review of processes and learning. http://unesdoc.unesco. Org/images/0019/00114/191442.

UNICEF & WHO (2018). Drinking water, sanitation and hygiene in schools: global baseline report 2018. New York: United Nations Children's Fund (UNICEF) and World Health Organization.

Wambua, M.M., Murungi, C.G., & Mutwiri, C. (2018). Physical facilities and strategies used by teachers to improve pupils' performance in social studies in Makueni County, Kenya. Int. J Pregn & Chi Birth, 4(6), 241–245.

Wambugu, T.W., & Busienei, J.R. (2017). Factors leading to Job Satisfaction of public secondary school teachers in Nairobi County, Kenya. *Strategic Journal of Business and Change Management, 2(122), 1988-2008.*