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Original Article

Influence of School Working Conditions of Teachers' Turnover on Learning Achievement in Biology in Public Secondary Schools in Garissa County, Kenya

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ABSTRACT

The modern propensity toward multi-disciplinary research and the alignment of scientific knowledge from different fields has led to significant overlap of the field of Biological sciences with other scientific disciplines. Modern principles of other fields such as Chemistry, Medicine, and Physics are integrated with those of Biology in areas such as Biochemistry, Biomedicine, and Biophysics, making Biology a valuable subject to humankind. However, the government's inability to retain qualified and experienced teachers in some schools due to high turnover impacts negatively on the students' learning achievement in this subject. This paper looks into the influence of school working conditions of teachers' turnover on learning achievement in Biology in public secondary schools in Garissa County. The study was conducted using pragmatic worldview and adopted a convergent mixed-methods design. With a target population of 2786 respondents from 40 public secondary schools, a sample size of 387 respondents was obtained. Using stratified random sampling, 27 schools were selected from which 336 students and 51 teachers of Biology were randomly and purposively drawn respectively. Data collection was done using Biology 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 school working conditions ($r=0.73$, $p<0.05$) had a positive significant correlation with students' learning achievement in Biology. Qualitative data findings revealed that majority of the teachers intended to transfer from rural to urban schools on the basis of unsuitable working conditions and insecurity. The study concluded that school working conditions of teachers' turnover influenced low learning achievement in Biology in the study area. The study therefore, recommended strategies that should lower teacher turnover and increase learning achievement in Biology as follows; school principals should provide good leadership and adequate instructional resources for effective teaching of Biology while the government should post security officers to every learning institution in Garissa County to safeguard the non-local teachers' safety and security.

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INTRODUCTION

The role of teachers in educating young people for the country's future prosperity cannot be underestimated. In the recent competitive academic climate, teachers are the most important assets for any institutional performance and survival (Gwavuya, 2011). Teachers' commitment, expertise, innovativeness and creativity determine the expected academic fulfilment of any learning institution's needs and keeps pace with technological advancement (Dawley et al., 2014). In recent decades, however, the emerging issue of staff retention continues to plague schools. Today, the high rate of teacher turnover in learning institutions is a great bother to educational stakeholders concerned with efficient and effective learning achievement of students (Choong et al., 2013). Therefore, the key significance of studying teachers' turnover cannot be overstated as teachers who intend to quit their profession usually reduce their efforts at work long before the actual exit which impacts negatively on students' learning achievement. (Rosenblatt & Shirom, 2016).

Learning achievement encompasses the acquisition of knowledge in various subject disciplines more so sciences. Science comprises the basic disciplines such as Biology, Physics, Chemistry and Mathematics. Biology is the natural science that studies life and living organisms, including their physical structure, chemical processes, molecular interactions, physiological mechanisms, development and evolution (Kenya Literature Bureau, 2018). As a subject, Biology deals with all the physicochemical aspects of life. However, with the recent tendency toward cross-disciplinary and unification of scientific knowledge, modern concepts in related fields such as medicine, physics and chemistry have been combined with Biology resulting in new subjects as; Biomedicine, Biochemistry and Biophysics (Cho, 2019).

According to Boe et al. (2017), teachers represent a category of workers that is globally experiencing shortage issues that are largely a result of high levels of turnover (Imran, 2017). Teachers' turnover are caused by a myriad reasons (Lilly et al., 2016) among them working in places that are tiring, unconducive, difficult to access, risky, demotivating have extremes of temperatures and are generally unpleasant (Nyamubarwa, 2013). These studies established that teaching in such places is very stressful and a major cause of both health and mental problems among teachers. The studies further add that teacher turnover intentions trigger teacher absenteeism and other teaching related problems including improper instructional strategies leading to low learning achievement among learners (Lilly et al., 2016; Nyamubarwa, 2013).

In Tanzania, a study by Demis and Debritu (2020), revealed that many educators were leaving the teaching profession in droves as a result of job dissatisfaction, too much paper-work and unconducive learning environment for other well-paying job opportunities thus lowering the quality of education in the country. Further, the studies expounded that unfair school management, school location and accessibility, inadequacy of salary and

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lack of training opportunities were major contributors to teachers' turnover which consequently lowered students' learning achievement in Tanzanian schools. In the same vein, Kenya's enrolment of students in secondary schools has tremendously increased in the last two decades owing to the introduction of free primary education and subsidized secondary education. This however has not been matched with commensurate recruitment and retention of teachers' leading to a generally low academic performance. The problem has further been compounded by massive teacher turnover for greener pastures.

A study by Ekabu (2018) established that several teachers were seeking employment in the county governments and other non-governmental organizations despite the government's effort to resolve teachers' turnover crisis by increasing yearly recruitment and harmonizing teacher salaries with those of other public servants. Review of related literature; Dijana (2015) and Onwonga (2018) however, still reveal that teachers' turnover intention which most often culminates to the actual quitting behavior persists, and is highest in teachers working in marginalized regions of the country such as Garissa County.

According to a study by Daniele (2016), qualified and seasoned teachers generally have better academic productivity and efficiency in teaching than new recruits due to their confidence at teaching methodologies and mastery of subject content. The study further showed that experienced teachers are also familiar with the needs of students, hence are best positioned to provide advice on how to meet those needs. The study also elaborated that when such teachers leave, their voices are lost and education policy suffers as senior education administrators no longer receive their feedback on the success or failure of different academic initiatives (Daniele, 2016).

A study by Oduor (2018) on teacher turnover intention, a predicament of teacher turnover reported that nationally, 129,600 out of the 288,000 teachers employed by TSC had shown intent to leave the teaching profession, translating to about 45% of voluntary turnover rate. The study further detailed that the majority of these teachers with the highest intent to transfer or leave teaching hailed from Garissa County, leading to calls for urgent need by the government and other education stakeholders to address the problem. This paper, therefore sought to establish the influence of school working conditions of teachers' turnover on learning achievement in Biology in public secondary schools in Garissa County.

Objective

To analyze the school working conditions of teachers' turnover on learning achievement in Biology in public secondary schools.

Study Hypothesis

$H_0$1: There is no significant relationship between school working conditions of teachers' turnover and learning achievement in Biology in public secondary schools.

Literature Review

Influence of Teachers' School Working Conditions of Turnover on Learning Achievement in Biology

According to Loeb et al. (2015), good school working conditions should include teacher support systems and mentorship programs. Several studies have linked poor school working conditions with teacher turnover. For instance, Cottini et al. (2011) established that teachers in unpleasant school workplace conditions are more likely to seek transfer or leave teaching entirely unless the necessary measures to improve the work conditions are taken. According to Njung'e (2015), teachers prefer working in learning institutions that have serene environment and conducive infrastructure. Gatsinzi and Makewa (2014) further stated that a school is more likely to retain effective teachers if it is led by a principal who promotes teachers' professionalism and provides an orderly learning environment. Firestone and Pennell (2012) observed that teachers stay longer and are more satisfied in schools that have independent student demographic characteristics, financial incentives and good administrative support. According to Ong, (2016), hardships encompassing various challenges teachers face as a result of unconducive environmental conditions and limited access to basic amenities can significantly influence high turnover rates. He

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alluded that limited access to clean water, inadequate housing and challenging climatic conditions teachers face are bound to negatively affect their quality of life and job satisfaction. The study pointed out that teachers perceiving these hardships as insurmountable are more likely inclined to seek transfer from their current schools or leave teaching entirely in search of better living conditions.

Studies; Mampane (2015) and Kontoma et al (2023) also linked school working atmosphere with student academic achievement. Suzanne (2011) for instance revealed that supportive school environmental conditions can enhance effective classroom instruction and improve students' learning achievement. Johnson et al. (2012), further expounds that an enabling school working environment increases teacher retention and leads to an improvement in students' learning achievement. Rosenholtz (2019) emphasized that teachers would be unable to put ideas into practice if the school setting lacks equipment and materials necessary for translation of teacher competences into reality. Further studies conducted by Greher and Tobin (2006) and Boyd et al. (2007) identify school's physical conditions, administrative support and workload as major factors in school working conditions influencing learner academic performance. This study expounds more on these factors in the ensuing discussion.

Teachers' School Physical Conditions of Turnover on Learning Achievement in Biology

The Kenya Ministry of Education Policy (2013) recommends that the school physical conditions ought to be made conducive to facilitate and enhance the learning process. The policy further stipulates that classrooms, laboratories and libraries should be well-constructed and spacious. Besides, there is need for provision of playing grounds, toilets and staff rooms for effective teaching and learning process. 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, school location and teacher safety, principal support and leadership, student attitude towards learning, prerequisite knowledge and instructional strategies employed by the teachers. According to IOL News (2017), school physical conditions can be a very strong incentive for a teacher to seek alternative employment opportunities elsewhere. Moreover, teachers perceive to work in inadequate school physical conditions tend to feel less valued and are more prone to seek transfer or leave their job position (Hansen & Corcoran, 2014).

Provision of good physical facilities in schools significantly promotes students' academic performance. For instance, Hansen and Corcoran (2014) have 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 and Emoruwa (2012) and Hallack (2010) have established a positive correlation between the school physical conditions and student learning achievement. These studies elaborated that school physical conditions go hand in hand with instructional materials for effective classroom instruction. According to Ikerionwu and Isola (2015) instructional materials are concrete or physical objects or devices which help the teacher to make a lesson much clearer to the learner.

Instructional resources equip students with vital knowledge and skills essential in problem-solving and critical analytical thinking (Saad & Sankaran, 2020). The study established that availability and adequacy of resource materials is key in bringing positive changes to the academic achievement of students. Syomwene (2016), further expounds that teachers should always incorporate instructional resources that are various, arouse interest in learners, are relevant and adequate to cater for the learners' educational needs effectively.

Wambua et al. (2018) opine that lack of or inadequacy of instructional resources lead to abstract instruction exhibited by passive learning which ultimately transcends to poor academic achievement. Twoli (2016) argued that text books enable the learners to follow the teacher's sequence of presentation and aids in understanding of lessons hence should be both available and adequate.

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School Access to Clean Water and Electric Connectivity of Teacher Turnover on Learning Achievement in Biology

Teacher working conditions are a major challenge contributing to teacher turnover all over the world. Teachers working in hardship regions characterized by unlit schools as a result of lack of electricity connectivity, water shortages, inadequate housing and health facilities are likely to develop higher intent to transfer or leave teaching (Nyaga, 2019).

According to UN General Assembly (2014) that declared "Water for Life", unsafe drinking water is the major contributor of numerous cases of waterborne diseases in school-going children, especially those found in ASAL. UNICEF and WHO (2018) in joint research found that access to safe drinking water is essential to health, a basic human right and a component of effective policy for health protection for both the school and community. Reviewed literature also indicate that provision of safe drinking water to learners as a way of reducing sanitation related diseases and improving health, retention and academic performance for all learners has serious positive effects on students' academic performance and school attendance rates. However, study by Obura (2018) has confirmed that the provision of safe drinking water to schools is still a large deficiency in rural schools in Kenya.

On the other hand, lack of electricity in learning institutions is unfortunate due to the multiple services it can provide in the classroom. According to a study by Kuo (2017), lighting as a result of electricity connectivity can enable children in classes to be taught both early in the morning and late at night. Furthermore, school access to electricity facilitates the integration of Information and Communication Technologies (ICTs) into the classroom teaching such as using computers, overhead projectors and televisions which leads to learner improvements on both test scores and graduation rates. Accordingly Kuo (2017), asserts that limited lighting as a result of lack of electric connectivity is rated the biggest obstacle in students' quest to learn and do homework.

Teacher's School Location and Safety of Turnover on Learning Achievement in Biology

Insecurity damages schools and limits educational opportunities causing teachers and learners to run for their lives (United Nation Report, 2015). According to Onwonga (2018), insecurity associated with conflicts and terror groups such as Al shabaab in Kenya and the insurgence of the Lord's Resistance Army in Uganda and Boko Haram in Nigeria keep children out of school. Such unrest, the study expounds has caused loss of lives, destruction of schools and displacement of families.

Obura (2018) further emphasizes that security is an issue of critical consideration affecting every teacher working in insecurity-prone regions and plays a pivotal role in influencing teacher turnover intentions. The study further elucidates that security being a broad term specifically encompasses personal safety and the safety of teachers' possessions and has led to increased teacher turnover with those feeling unsafe in their working and living environments taking fore front in seeking for transfer or employment opportunities in areas they perceive have better security measures. Ong (2016) posit that teachers prefer working in serene environments surrounded by friendly and supportive neighborhood for improved students' educational attainment. The study further alluded that the rampant insecurity in most parts of ASAL in Kenya as a result of inadequate security officers was the greatest barrier to the provision of quality education to the school going children. Onwonga (2018) added that understanding and addressing the aspects of insecurity is essential for educational policymakers in their efforts to enhance teacher retention and improve the education standards of a region. This article endeavored to find out how insecurity influenced student learning achievement in Biology in public secondary schools in Garissa County.

On the other hand, a study by MacIntosh (2013) also observed that school location influences teachers' turnover. According to the study, majority of the teachers are reluctant to teach in schools found in rural, marginalized or far-flung remote areas faced with insecurity issues. Akinyele (2014) established that majority of the teachers are often observed scrambling for schools located in urban centers or

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along major road systems for perceived good working conditions and ease in access.

According to Hu (2015), there is a relationship between the school location and students' learning achievement in terms of learner motivation and teachers' retention. Compared with urban students, the study established that rural school learners tend to have lower educational aspirations, less value attached to education and are lowly motivated to learn. Yara (2016) further argued that rural schools have tendency of being disliked by highly qualified teachers and most parents. However, studies of Yusuf and Adigun (2010) and Ajaja (2015) observed that there is no significant difference between students' learning achievement in urban schools and those in rural schools putting a stop to earlier held perceptions by most people. The current study intends to ascertain if low learning achievement in Biology in Garissa County is caused by school location and area insecurity.

Teacher's Administrative Support and Leadership Style of Turnover on Learning Achievement in Biology

According to the findings of the study by Thibodeaux et al. (2015), principals' leadership style plays crucial roles in the retention of teachers; hence, school administrators ought to be mindful of how their leadership styles and actions impact on the teachers. Puni et al. (2016) found that teachers under autocratic leaders are more prone to quit teaching job mainly as a result of the school heads over emphasis on production than teachers. However, Chowdhury (2015) found negative insignificant association between school leadership style and teacher turnover.

Recent studies have also indicated the influence of school leadership style on students' learning achievement (Liebowitz & Porter, 2019). Leithwood et al. (2016) purported that the principal's leadership style is the second influence on student learning achievement besides classroom instructional strategies. According to Day et al. (2016), instructional leadership theory posts that the school heads ought to concentrate their efforts and energies in promoting enhanced student learning achievements in schools. In the same vein, Muasya (2018) opined that instructional leadership practices are strongly associated with student learning achievement. The theory asserts that transformational leadership strives to establish institutional culture and vision aimed at enhancing teaching and learning quality.

The study by Bass and Avolio (2014), opines that school principals should exercise transformational leadership styles to stimulate and inspire teachers in achieving highest academic performance beyond expectation and in the process develop their own capacities. The study adds that a transformational school head aims at building shared vision, responds to subordinates' individual and institutional needs through empowerment and aligns institutional goals with those of teachers. The study further expounds that transformational leadership style is associated with high level of teacher commitment which translates to highest performance that results to enhanced learning achievement. The study by Leithwood et al. (2016) revealed that principals' supervisory role of reviewing teachers' lesson notes and assessing them in class positively and significantly relates to enhanced student learning achievement.

Teachers' Collaboration and Mentorship of Turnover on Learning Achievement in Biology

Thibodeaux et al. (2015) observe that principals should always support new teachers through mentoring. Fransson and Frelin (2016) further state that mentorship programs are adopted in education sector in an effort to help new teacher recruits acclimatize to their new job demands. In the same vein, Firestone and Pennell (2012) observe that the program helps new teachers in knowing their job expectations, increasing job satisfaction and student learning achievement.

Further, Mathur et al. (2012) established that 40 of the 42 new mentored teachers never exited the teaching profession. The study argues that effective mentoring of new teachers would more likely retain such teachers in the teaching profession due to the experience of more support and suitable working conditions. Fransson and Frelin (2016) argued that teachers who experienced mentorship were more likely to stay in the profession compared to those who did not.

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Besides teacher retention, a study by Stanulis and Floden (2009) supposed that mentoring provides instructional support and promotes unity between newly employed teachers and the rest of the staff. The study concluded that mentoring programs ideally promotes teacher efficacy, performance, alleviates stress associated with being in a new profession and encourages teacher retention. In spite of availability of a plethora of literature relating to the different themes on teacher mentorship programs being relevant to this study, a few scholars considered the influence teacher mentoring had on student learning achievement. This article, therefore, aimed at providing useful insight on this aspect.

Teachers' Autonomy of Turnover on Learning Achievement in Biology

Ingersoll and May (2012) define autonomy as the degree of teacher control over classroom activities. According to the study, such control is related to factors like selecting textbooks and other instructional materials, selecting content and skills to be taught, selecting teaching techniques, evaluating and grading students, determining the amount of homework to be assigned and disciplining students. In this study teachers' autonomy was used to refer to self-directing freedom and particularly independence in teachers' choice of instructional strategies.

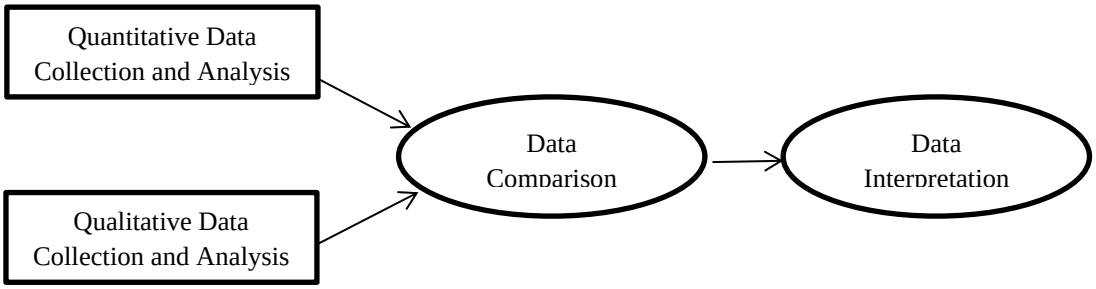
Research has found that teachers' autonomy has an influence on their turnover. For instance, Ingersoll and May (2012) revealed that teachers who perceive to have poor autonomy are more inclined to move to another school or leave the profession compared to those perceived to have good autonomy. Crookes (2017) expounds that education programs which limit teacher autonomy can create feelings of powerlessness, anxiety, and resentment resulting in development of turnover. In the same vein Pearson and Moomaw (2015) note that, teacher autonomy is strongly related to feelings of professionalism and it is a key factor in influencing teachers to stay in education hence enhances student learning outcome.

Teachers practicing autonomy reflect in their teaching by setting realistic goals. According to Crookes (2017), autonomous teachers have high levels of self-esteem, are analytical and aware of their strengths and weaknesses. Kabiri et al. (2018), further assert that autonomous teachers are self-driven, initiative and pursue instructional tasks unsupervised from their seniors. The current study attempted to find out how teacher autonomy in public secondary schools in Garissa County influences the students' learning achievement in Biology.

Methodology

The study adopted the Pragmatic Worldview arising out of actions, situations, and consequences and it is concerned with applications, that is, 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). The study further employs a convergent mixed methods research design using both quantitative and qualitative approaches in data collection and analysis (Leedy & Ormron, 2016).

Figure1. Convergent Research Design



Source: Creswell & Creswell, 2018

The above 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 from the participants to extensively understand the study topic, and had adequate required skills to handle both quantitative and

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qualitative research methods (Creswell & Creswell 2023).

The study was conducted in Garissa County, one of the most marginalized parts of the country with the highest levels of poverty, unemployment and insecurity. The sub counties making up the study area are; Garissa Township, Fafi, Ijara, Lagdera, Daadab, Balambala and Hulugho. According to the Ministry of Education data of 2023, Garissa County has 2691 form three students and 95 teachers of Biology drawn from 40 registered public secondary schools. The schools consist of two national, three extra-county and several county and sub county schools. Both teachers and learners in these schools formed the study target population.

The study adopted stratified sampling technique in dividing population into categories based on their demographic designation. The categories included teachers currently teaching Biology in form three and the form three Biology students. The categorization was done to separate the population into homogenous subjects that share similar characteristics so as to ensure equitable representation of the population in the sample (Kothari & Garge, 2014). All the sub county public secondary schools in the study area were then purposively selected for uniformity of data collected.

Table 1: Target Population and Sample Size

Respondents	Target Population	Sample	Percentage
Teachers of Biology	95	51	53.0%
Form Three Students	2691	336	12.5%
Total	2786	387	65.5%

Source: Field Data, 2023

For data collection, Biology Teacher Questionnaire and document analysis guide were used (Mugenda & Mugenda, 2019; Creswell, 2014) and further analyzed using descriptive and inferential statistics using Pearson Product Moment Correlation and Multiple Linear Regressions for quantitative data (Kumari & Yadav, 2018). Data from document analysis guides and open-ended questions from Biology teachers' questionnaire were analyzed qualitatively using thematic analysis for which results are presented in the next section.

Results and Discussion

Since the instructional process in Biology goes on in a school setting, an analysis of the influence of school working conditions of teachers' turnover on learning achievement in Biology was inevitable. In order to address this objective, 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. This was aimed at finding out whether there was any relationship between school working conditions of teachers' turnover and students' learning achievement in Biology. To this end, inferential statistics using Pearson Product Moment Correlation Coefficient (r) was employed. Table 2 shows how the teachers of Biology from public secondary schools in Garissa County responded to the questionnaire items. The descriptive results are presented using frequencies, percentages, means and standard deviations displayed.

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Table 2: Influence of School Working Conditions on Learning Achievement in Biology

Statements	SD (%)	D (%)	U (%)	A (%)	SA (%)	M	SD
7. i. My school has adequate Playgrounds	20(40.8)	22(44.9)	1(2.0)	4(8.2)	2(4.1)	1.89	1.15
ii. My school has adequate washrooms	21(42.9)	9(38.8)	5(10.2)	4(8.2)	0(0.0)	1.79	0.92
iii. My school has adequate classrooms	15(30.6)	18(36.7)	3(6.1)	9(18.4)	4(8.2)	2.16	1.30
8. i. My school has adequate Biology reference books	17(34.7)	23(46.9)	2(4.1)	6(12.2)	1(2.0)	2.04	1.04
ii. My school has adequate Biology charts & models	18(36.7)	19(38.8)	6(12.2)	5(10.2)	1(2.0)	2.02	1.02
9. i. My school has adequate Laboratory &lab equip.	14(28.6)	17(34.7)	7(14.3)	9(18.4)	2(4.1)	2.36	1.20
ii. My school has adequate and spacious library	18(36.7)	21(42.9)	5(10.2)	3(6.1)	1(2.0)	1.88	.97
10.i. My school has adequate clean water supply	20(40.8)	21(42.9)	2(4.1)	4(8.2)	2(4.1)	1.93	.98
ii. My school has reliable electric connectivity	16(32.7)	18(36.7)	5(10.2)	7(14.3)	3(6.1)	2.31	1.22
11. My school location is safe	14(28.6)	16(32.7)	7(14.3)	6(12.2)	6(12.2)	2.19	1.29
12. My school has friendly and supportive neighbors	13(26.5)	18(36.7)	9(18.4)	8(16.3)	1(2.0)	2.32	1.06
13. Security post in my school is adequate to protect me	7(14.3)	15(30.6)	8(16.3)	9(18.4)	7(14.3)	2.82	1.32
14.i. 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
ii. My principal is a transformative leader	17(34.7)	19(38.8)	3(6.1)	6(12.2)	4(8.2)	1.32	1.28
15. My school encourages collaborative teaching	15(30.6)	18(36.7)	6(12.2)	8(16.3)	2(4.1)	2.26	1.17
16. My school has a sound mentorship program	13(26.5)	20(40.8)	8(16.3)	7(14.3)	1(2.0)	2.35	1.03
17. 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
18. My principal incorporates my ideas in school policies	20(40.8)	14(28.6)	5(10.2)	8(16.3)	2(4.1)	2.22	1.25
Average Mean and SD						**2.11**	**1.14**

Source: Field Data, 2023

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

Under the institutional physical infrastructure, the study examined the availability and adequacy of the school playgrounds, washrooms and classrooms. From the descriptive statistics in Table 2, the results indicate that 42(85.7%) of the teachers disagreed that their schools did not have adequate playgrounds for learners' recreational activities which enhanced learning environment in Biology. 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 Biology in public secondary schools in Garissa County believed that learning achievement in their subject was low due to most schools lacking adequate recreational facilities.

Secondly, on availability and adequacy of both learners' and teachers' washrooms in schools, the descriptive results indicate that majority of the teachers of Biology; 40(81.7%) disagreed on adequacy of the facility while only 4(8.2%) agreed

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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 learning achievement in Biology was low because most of the schools in the study site did not have adequate washrooms which are essential in provision of an enabling learning environment.

Classrooms are important for Biology instruction. On whether schools had adequate classrooms, the results indicate that 33(67.3%) of the teachers of Biology disagreed that although the Kenyan government through CDF and some 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 on adequacy of classrooms in their schools 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 Biology public secondary schools in Garissa County was jeopardized as a result of schools lacking adequate classrooms which resulted to overpopulated 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 majority of the learners did not have adequate reference materials in Biology and also quiet places ideal for individualized studies. Lack of such important resource in schools impinges on the teaching and learning process in Biology leading to low scores since learners did not avenue they could refer or consult books on their own.

Studies have shown that when schools physical infrastructure such as classrooms, laboratories and libraries are unavailable or inadequate, student learning achievement deteriorates. The current study's finding is supported by available literature; Ijaduola (2007), Firestone and Pennell (2012) and IOL News (2017) which 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 like Gatsinzi and Makewa (2014), and Rosenholtz (2019) who found a significant relationship between unpleasant school workplace conditions and ineffective classroom instruction which according to the scholars was considered a recipe to low students' learning achievement. The study finding further 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 two studies 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. According to IOL News (2017), a teacher becomes less innovative and creative due to low intrinsic motivation resulting from straining in unpleasant work atmosphere.

The descriptive results also indicate that majority of the teachers 40(81.6%) disagreed that their schools had adequate Biology course and reference books for Biology 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 Biology associated low learning achievement in Biology as a result of unavailability of instructional books in the subject which affects the teaching and learning process. In some schools both course and reference books were completely unavailable, inadequate, outdated or torn.

More so, when asked whether their schools had adequate Biology charts and models, the statistical results show that majority of the teachers; 37(75.6%) disagreed while 6(12.2%) agreed. 6(12.2%) however, were undecided. The item had a mean of 2.02 and a standard deviation of 1.04 implying that majority of teachers of Biology from public secondary schools in the study site associated low learning achievement in Biology with inadequacy of charts and models essential in the subject's instructional process. Biology charts and models link abstract concepts learned theoretically to a three-dimensional practical aspect hence enhancing concept comprehension.

In addition, on the availability and adequacy of laboratories, laboratory equipment and reagents in their schools, the results indicate that 31(63.2%) of

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the teachers disagreed with the statement 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 secondary school teachers of Biology in Garissa County insinuated that learning achievement in Biology was low because most schools lacked laboratories and laboratory equipment/reagents which are essential for teaching practical concepts in the subject. Currently, KICD espouses that science-oriented subjects should be taught practically to improve learning achievements in the subjects.

This finding is authenticated by the data collected using the Document Analysis Guide where records revealed that some schools due to unavailability of laboratories, their learners had occasionally to walk long distances to neighboring schools to carry out Biology practical lessons. Unavailability or inadequacies in Biology instructional resources in schools affect the effectiveness of teachers in the subject's instructional process.

However, these findings contrast the suggestions of such scholars as Ikerionwu and Isola (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 made tremendous enhancement of lesson impact if intelligently used. Similarly, Saad and Sankaran (2020) observe that instructional resources are very important in learning of Biology by equipping the students with vital knowledge and skills essential in problem-solving and critical analytical thinking.

The findings also contradict the study by Wambua et al. (2018) that showed that inadequacy of instructional resources lead to abstract instruction exhibited by passive learning which ultimately results to low learning achievement. According to Rosenholtz (2019), 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 Biology disagreed on whether their schools had access to clean and reliable water supply (Mean=1.93, SD=0.98). Lack of a basic need such as water makes teachers of Biology in public secondary schools in the study site unsettled and uncomfortable in their stay and will spend a lot of their time in search of this essential commodity at the expense of engaging themselves fully in teaching process.

Similarly, the collected data confirms that 34(69.4%) of the teachers disagreed when asked if their schools had electricity. Only 10(20.4%) agreed with 5(10.2%) remaining non-committal. The item had a mean and standard deviation of (M=2.31, SD=1.22) implying that most schools lacked electricity connection hence it was cumbersome to produce voluminous study materials in Biology for instruction or revision. In some instances, teachers still wrote Biology exam on chalkboard or have to bear with poor road system to travel to a nearby Centre and print teaching and revision materials in the subject.

The finding on unavailability of clean and reliable water supply in schools in study site contravenes the recommendations of a study by UNICEF and WHO Joint Monitoring Programme (2018) which demonstrated that the school going children exposed to clean surrounding and basic facilities such as safe drinking water, clean school toilets, hand washing facilities and basic information on hygiene 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, essential for their academic performance. In similar 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.

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Concerning the safety of their school locations for stay and for Biology classroom instructional process, majority of the teachers of Biology represented by 30(61.3%) disagreed while 12(24.4%) agreed with the statement. Only a paltry 7(14.3%) were undecided. This affirmed that teacher insecurity posed by school location is a hindrance to effective Biology classroom instructional process (Mean=2.19, SD=1.29). Stated differently, school location is considered a security issue in Garissa County. Majority of the teachers believed that their school location does not guarantee them safety to effectively engage in the teaching process. Most schools located in far flung remote areas especially those bordering Somalia are feared by non-local teachers as a result of frequent attacks on non-Muslim teachers by Alshabaab terror group.

The researcher as well used the Document Analysis Guide to corroborate the information collected using the Biology Teachers' Questionnaire. The researcher was interested in analyzing particularly the teachers' transfer requests, resignations, duty desertions and interdictions. The records obtained from the majority of rural bound schools the researcher visited were blotted with transfer requests of teachers dating as early as 2012 intending to be transferred to urban schools. The records further revealed a large number of teachers from the remote areas of the County whose transfer requests were not honored had registered a considerably large number of resignations, duty desertion and some were serving interdictions as compared to their colleagues in urban schools within the County. The documents also indicated that majority of the teachers intending to transfer had quoted insecurity and un-conduciveness of the learning environment as the main reasons they wished to be transferred.

Similarly, the results from the Table 4.8 indicate that 31(63.2%) of teachers of Biology disagreed that their schools were surrounded by friendly and supportive neighbors. On the other hand, 9(18.4%) of teachers agreed with the questionnaire item while 9(18.4%) were undecided. The item scored (M= 2.32, SD= 1.06). This implies that majority of teachers of Biology in public secondary schools in study site asserted that learning achievement in Biology was dismal since most of them were surrounded by unfriendly and unsupportive neighbors. At times the teachers claimed, they attacked them in school compounds and chased them from communal water points. The animosity between schools as systems with their surroundings is bound to result in unconducive learning environment which impinges on effective classroom instructional process.

Moreover, the descriptive results also show that 22(44.9%) of the teachers disagreed that the security posts in some of their schools were adequate in protecting them from any internal or external attacks. However, 18(36.7%) of the teachers agreed while 8(16.3%) were undecided. This implies that majority of the teachers believed that their schools were moderately safe (Mean= 2.82, SD=1.32) for them to fully concentrate on teaching of Biology.

These findings are consistent with the work of United Nation Report (2015) which reported that insecurity damages schools and limits educational opportunities in communities by causing teachers and learners to run for their lives. The study results are also supported by views of Onwonga (2018), who stated that insecurity keep teachers and children out of schools as a result of unrest that cause loss of lives, destruction of schools and displacement of people. This observation, according to MacIntosh (2013), leads to teacher shortages and lack of adequate learning facilities and resources that negatively affect both teachers' and students' motivation and productivity leading to low students' learning achievement.

The results also indicate that a significant number of the teachers; 31(63.6%) disagreed regarding administrative support in giving them institutional needs and honoring their requisitions for Biology instructional materials while only 10(20.4%) agreed. This item had a mean and standard deviation as depicted by (M=2.06, SD=1.25) implying that majority of secondary school teachers of Biology in Garissa County doubt if their school administrators offered them enough support essential in teaching and learning of Biology and also on matters concerning learners' discipline. Such perception from the subject experts infringes on their efficiency in curriculum implementation and provision of quality teaching in Biology subject and would eventually lead to low learning achievement.

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In similar vein the results show that the majority of the teachers of Biology represented by 36(73.5%) claimed that their principals did not promote enhanced student learning achievement in Biology through extrinsic motivation (Mean=1.32, SD=1.28). This implies that in most schools, learners were not motivated either through recognition, cash rewards or any other form of awards to encourage them put more effort in studying Biology which culminates in enhanced scores in the subject.

The study findings regarding the administrative support in Biology instruction needs confirm the earlier work of Shuck et al. (2011) that revealed that teachers' job commitment and productivity varied according to the school leadership styles. The results also contravene the views of Thibodeaux et al. (2015) which stated that the principals' leadership plays crucial roles in the retention of teachers for Biology instructional consistence essential for improved learning outcome. This is however inconsistent with the suggestions of 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 study results disagree with the findings of Chowdhury (2015) that revealed negative insignificant association between school leadership styles and students' learning achievement.

When asked to establish whether teacher collaboration and peer teaching existed in their schools, the results indicate that majority of the teachers of Biology 33(67.3%) disagreed. However, 10(20.4%) agreed while a paltry 6(12.2 %) were not sure. This item was rated at (M=2.26, SD= 1.17) scores. The low mean and standard deviation imply that the majority of public secondary schools in Garissa County did not give priority to teacher collaboration and peer teaching in Biology possibly explaining why the learners did not perform well in the subject due to effects of consistent teacher monotony.

In addition, when asked whether their schools had mentorship programs, 33(67.3%) of teachers disagreed while 8(16.3%) agreed and 8(16.3%) were undecided. The mean rating and standard deviation for this item was M=2.35, SD=1.03 implying that the majority of teachers of Biology agreed that their schools did not have robust mentorship programs significant in helping new teacher recruits acclimatize to their new careers. The findings are in agreement with the opinions of Bey (2011); Thibodeaux et al. (2015) and Fransson and Frelin (2016) who found a significance inverse relationship between teacher collaboration and mentorship and turnover intentions. The results are also in consonance with Fransson and Frelin (2016) who argued that teachers who experienced mentorship were more prone to stay in the profession compared to those who did not.

Moreover, the teachers of Biology were asked to comment whether their principals allowed them independence in the choice of Biology instructional strategies and resources. The results obtained demonstrated that 69.4%, representing the majority disagreed to being free as pertains their autonomy in choice of Biology classroom instructional process (M= 2.08, SD= 1.08). Denying professionally trained teachers of Biology instructional mandate as indicated above kills their morale and reduces their efficiency in teaching of the subject and may be reflected in low student learning achievement.

The final item under the second objective of the study sought to find out whether the school principals in study site incorporated the ideas of teachers of Biology in school decision making process regarding school policies and student discipline. The statistics from Table 2 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 (M= 2.22, SD= 1.25). Non participation of teachers in issues pertaining school policies and students' welfare and discipline 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 Biology which culminates in low learning achievement.

These results confirm the findings of May (2012), and Pearson and Moomaw (2015) who postulated that education programs which limit teacher autonomy can create feelings of powerlessness,

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anxiety, and resentment and result in development of turnover intentions. The findings also conform to the study by Mayer et al. (2013), which asserted that teacher autonomy enhances student learning outcome, particularly through the teacher's independence in the choice of instructional strategies, students' evaluation and discipline.

The average mean for the Biology teachers' school working conditions of turnover on their instructional process in the subject is 2.11 with a standard deviation of 1.14. The implication of this statement is that school working conditions in the study area affected teachers' efficiency in the Biology teaching process. Finally, inferential statistics were used to test the hypothesis:

> *$H_{01:}$ There is no significant relationship between school working conditions of teachers' turnover and learning achievement in Biology*

Pearson Product Moment Correlation at an alpha level of 0.05 and degrees of freedom of 47 (49-2) was used. 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 computation output is shown in Table 3 below.

Table 3: Pearson's Correlation Analysis between Teachers' School Working Conditions and Learning Achievement in Biology

Correlations			
		School Working Conditions	**Learning Achievement**
School Working Conditions	Pearson Correlation	1	.73**
	Sig. (2-tailed)		.000
	N	49	49
Learning Achievement	Pearson Correlation	.73**	1
	Sig. (2-tailed)	.000	
	N	49	49

From Table 2, the observed results were (r= .73 p= .000). An r-value of .73 indicates a moderate positive relationship between the school working conditions and the learning achievement in Biology. The result implies that the learning achievement in Biology in the study area is influenced by the state of the teachers' school working conditions. Since the p-value is less than the alpha level of .05, evidence is thus provided against the stated null hypothesis; there is no significant relationship between school working conditions of teachers' turnover and learning achievement in Biology in public secondary schools, which is consequently rejected in favor of the alternative hypothesis. The study thus concludes that the school working conditions of teachers' turnover in study site are significantly related to the learning achievement in Biology. The interpretation of this statement therefore, is that an improvement in public secondary schools' working conditions in Garissa County would result in enhanced student learning achievement in Biology and vice versa.

In order to establish the contribution of the predictor variable to the variation in the response variable; students' learning achievement in Biology, regression analysis was carried out and the results presented in Table 4.

Table 4: Regression Coefficients

		Unstandardized Coefficients		**Standardized Coefficients**		
Model	**Variable**	**B**	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	1.032	.215		4.797	.000
	School Working Conditions	.194	.195	.518	.997	.021

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The general model equation from the results in Table 4 that predicts school working conditions on students' learning is given as:

$$Y = 1.032 + \ .194X_2$$

The hypothesis:

> *$H_0$2: There is no significant relationship between school working conditions of teachers' turnover and learning achievement in Biology in public secondary schools*

(t(47)= 1.00, p =.021< .05) is significant, hence, the null hypothesis is rejected. The interpretation of this is that one unit change in school working conditions would cause a change of .194 or 19.4 % in learning achievement in Biology.

Implications to Theory and Practice

The findings of this study are necessary in creating awareness to the school administrators on being sensitive and strive to improve teacher working conditions in their schools. Of particular interest were the schools found in far flung, remote and marginalized regions of the country which annually record a significantly high rate of teacher turnover. Secondly, the findings will equally benefit policy makers, and all key stakeholders concerned with efficient and effective learning in Biology in unconducive and insecurity prone regions in Kenya.

Conclusion

The study finds a moderate positive significant correlation between school working conditions of teachers' turnover and learning achievement in Biology in public secondary schools in Garissa County. This suggests that work conditions are significantly related to learning achievement, meaning that unconducive school working conditions; including inadequacy of physical infrastructure and instructional resources, insecurity and poor leadership styles was a common issue in most of the sampled secondary schools in the study site (Mean = 2.11, S.D = 1.140). These un-enabling conditions influenced both teachers' turnover and students' learning achievement in Biology. The departure of these experienced teachers as a result of unconducive work environment and insecurity leaves classrooms without subject specialists which affect the instructional strategies in Biology as learners are left unattended. Conclusively, teachers' turnover has a negative influence on the efficiency with which teachers select the instructional resources, teaching strategies and also engage in Biology instruction process. This lowers their effectiveness, performance and productivity leading to low learning achievement in the subject.

Recommendations

- 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 teaching and learning of Biology.
- The school principals should demonstrate good leadership and be supportive to enhance the school instructional process in Biology.
- The government, TSC and the school management should attach security post to every learning institution, install CCTV cameras and increase the number of security officers manning these schools to ensure non-local teachers' safety.

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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.

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