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Formative Evaluation and Its Influence on Academic Performance in Biology Among Students in Secondary Schools in Siaya County, Kenya

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Abstract

Purpose: The study aimed to investigate how formative evaluation influences learners' academic achievement in biology in high schools in Siaya County, Kenya. The research is based on three major objectives: to determine how feedback on formative evaluation relates to the performance of learners in biology, to find out how frequency on formative evaluation relates to the performance of learners in biology, and to establish how learning through assignments relates with the performance of learners in biology.

Methods: The research used a descriptive research design study. The study targeted 159 secondary schools in Siaya. Through the random sampling method, a sample of 30 respondents consisting of deputy principals, principals, and teachers, was used to collect primary data. Qualitative data were analyzed using content analysis. Quantitative data was analyzed using descriptive statistics and regression analysis.

Results: The study findings showed that feedback on formative evaluation, frequency of formative evaluation, and learning through assignments had a positive and significant relationship with learners' academic performance in biology.

Conclusion: To increase openness in the learning process and set an example for students on how to acquire new skills, good feedback should be connected to explicit expectations for students' performance. Additionally, feedback needs to be provided precisely, on time, and with suggestions for how to improve moving forward. Teachers should regularly and interactively assess students' understanding in formative assessment-equipped classrooms.

Keywords: *Formative Evaluation, feedback, frequency, learning through assignments, academic Performance, Biology*

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1. Introduction

Globally, assessment of students' academic performance has been proven to be a primary step of any educational project as it provides data regarding the success in attaining specific objectives of teaching. Evaluation is regarded as a testing process that is reliable in collecting formative information. Similarly, it can refer to generating extrapolations depending on the academic achievement of students concerning different bona fide learning goings-on, whether the extrapolations are for formative or summative reasons (Shuster, 2014). Consistent quality

improvement of formal learning majorly depends on the available well-conceived approaches used in evaluation with both collective and determinative purposes.

For many years, formative evaluation has turned out to be a major concern in the entire education sector across the world. Stakeholders in the education sector, including researchers, teachers, and policymakers, have continued to show a lot of interest in formative evaluation since it supports and reflects students' learning. For instance, in the United States, formative evaluation is used as an official policy in schools within 25 states (Shuster, 2014). The policy is considered an important strategy for achieving several targets set out within various Organization for Economic Co-operation and Development (OECD) (Mensah, Dauda, Boamah, Salman, Appiah-Tum & Tachie 2019). To ensure the effectiveness of formative evaluation, several countries have come up with guidance books used by teachers in employing a more methodical developmental assessment process. A determinative valuation plan was instigated in England in the year 2000 at both primary and secondary schools (Burner, 2016). Additionally, New Zealand has linked its national assessment strategy to formative assessment. More countries such as Spain, Germany, Finland, and Sweden have also stressed the effectiveness of formative assessment and the need to continue evaluating students with the use of various assessment methods, including portfolio assessment, interviews, and the use of verbal feedback (Burner, 2016).

Generally, assessment can entail a formative role that both teachers and students can use to enhance their learning experiences. To ensure that the learning process as a whole is successful, formative assessment can thus be defined as a technique that educators and students utilize to recognize and respond to each other's learning processes (Burner, 2016). Dividing the entire course into distinct hierarchical parts that can be used for instruction is necessary to implement formative evaluation in the learning-teaching process. That is, administration of summative tests, which is done after the completion of all units, giving specifications of objectives for each unit, provision of group-based remediation especially in places where there are deficiencies of students before incorporating other units, and also validating and designing various formative tests that are validated (Mahshanian, Shoghi & Bahrami 2019). Breaking up the curriculum into smaller elements enables learners to sufficiently get ready for their various assessments. Additionally, providing students with such tests frequently enhances their commitment and involvement in the entire teaching-learning process, improving their performances. Determinative valuation is beneficial first to teachers as a mechanism of identifying the studying hitches of their students together with development of various alternate corrective procedures and secondly to teachers as a strategy for discovering the exact challenges their learners experience in specific contents of the entire course (Mahshanian et al., 2019).

Formative evaluation serves three major functions: motivating students, facilitating the transfer of learning, and increasing retention. Moreover, responses made by students regarding a formative assessment may be examined to divulge individual and group mistakes that require rectification (William, 2011). According to Alonge (2004), the results obtained from the investigations regarding the extent towards which formative evaluation and characteristics of cognitive entry measured the academic performance of students across all undergraduates in universities indicated that formative assessment portrays the highest level of strength toward academic achievements with all variables being put into consideration. According to another study conducted among polytechnic students, the cognitive entry characteristics, which entail Polytechnics and Colleges Entrance Examination and West African School Certificate not directly relate to the academic achievements of polytechnic students in biology a subject

(Alonge, 2004). In our modern societies, Biology is considered a basic foundation for technological and scientific knowledge. Biology as a subject plays a key role in scientific, technological, political, and socioeconomic developments within our societies. The subject, of biology, is used by all universities to consider learners for entry into science different degree programs that are science-based.

1.1 Problem Statement

The importance of Biology to individuals and even to society has been greatly acknowledged. That is what makes Biology an obligatory subject in most Secondary schools in the country today. However, student's performance in the subject in the national examinations is worrying. Kenya National Examination Council decries poor results in Biology which has recorded adverse results over the past six years, thereby raising fear as most learners from Siaya county get denied to pursue courses like medicine which require good grades in biology for one to take them (KNEC, 2016, 2017, 2018, 2019, 2020 and 2021). There have been speculations that lack of formative evaluation and poor utilization of formative evaluation methods in public high schools in Siaya County is the major cause of poor performance in Biology. Therefore, the study intended to ascertain whether formative evaluation can improve learners' academic performance in biology. Formative evaluation is key in improving performance of students in any given school thus a need to incorporate formative evaluation in teaching biology in all Secondary schools in Siaya.

1.2 Research Hypotheses

H_{01}: There is no statistically significant relationship between feedback on formative evaluation and the performance of learners in biology in Siaya County

H_{02}: Frequency on formative evaluation does not have a statistically significant relationship with the performance of learners in biology in Siaya County

H_{03}: There is no statistically significant relationship between learning through assignments and the performance of learners in biology in Siaya County

2. Literature Review

2.1 Theoretical Review

The research was steered by the Classical Conditioning Model by Ivan Pavlov (1929-1936). The theory is also known as respondent conditioning or Pavlovian. It refers to learning through association. That is, two different impetuses are connected to generate a different studied retort in an animal or a human. This theory comprises three stages; before acquisition, acquisition, and after acquisition. The utmost well-known instance of classical habituation was Pavlov's test which used dogs. Pavlov experimented on dogs and noticed that dogs learned to drool in rejoinder to a buzzer after numerous tests after the food was withdrawn. In relation to this study, the two different stimuli incorporated together are the formative evaluations and students' class work. The association of students and formative evaluation leads to improved performance in Biology. Students respond to formative evaluation through good performance in Biology. The three stages of classical conditioning theory are also relevant to this research because the researcher was also relating students' achievement before implementation of formative evaluation (before acquisition), how formative evaluation was adopted (acquisition), and therefore the impacts of formative assessment on the performance of students in biology in Siaya County, Kenya (after acquisition). This theory was also relevant in the study since students in secondary schools are expected to obtain excellent scores when they are trained and subjected to numerous tests of incessant valuation events. Classical conditioning theory relates

to this study in the sense that students are expected to perform better after adopting formative evaluation.

2.2 Empirical Review

2.2.1 The Impact of Evaluation Feedback on Performance of Students in Biology

The concept of feedback stands at the center of determinative valuation. The intensity of the impact of determinative valuation is generated from levels of strength of feedback the students are provided with on their studying and to teachers on their coaching methods (Andrade & Valtcheva 2009). Determinative response entails info conveyed to learners, which permits them to shape their behaviors or judgments to advance their studying abilities. The response presented through determinative valuation comes with benefits, especially if it provides learners with a learning profile, helping them improve their learning skills, reinforcing their work, and playing a key role in motivating students (Snowball & Sayigh, 2007). However, instructors are not the only ones to respond. Self-valuations and peers can be prudently trained, hence managing students to develop learning-oriented and constructive responses without intervention (Andrade, Lui, Palma & Hefferen 2015). Self-valuation entails a procedure through which learners can evaluate their work depending on the available expectations, provided in the form of criteria and goals (Andrade & Valtcheva, 2009). Essentially, self-valuation is a form of determinative valuation plan that offers learners with response regarding their presentation depending on criteria and established standards and provides information on how to develop adjustments that will help them improve how they learn and what they learn. Additionally, self-assessment is considered a major element of determinative valuation for it directly aids learners take part in activities involving studying objectives.

Even though feedback plays a crucial role in formative evaluation, not all feedback is always effective. In most cases, feedback enables students to understand how they are progressing in their learning processes. Of importance, any feedback should be specific and timely; it should also include multiple suggestions on how future performance should be improved. Sufficient and effective feedback should incorporate criteria regarding students' performance, hence ensuring the learning process is more transparent (Andrade & Valtcheva, 2009). Another aim of determinative valuation is to offer a direct response concerning teaching and learning processes hence providing beneficial effects for both teachers and learners. Teachers may provide either verbal or written feedback to their students. According to teachers and several researchers, effective feedback should be explicitly tied to criteria, timely and specific (Crooks, 2007). Further, teachers always adjust their strategies to align with the specific needs featured in the assessment. Both written and verbal communication should specifically focus on what seems to be wrong with the student’s work and what obligatory actions need to be used to advance on the same (Crooks, 2007). However, teachers should ensure that the feedback message is more concerned with improvement than evaluation.

2.2.2 The Relationship between Formative Evaluation Frequency and Performance of Students

The type of valuation used, which must precisely match the course or subject's learning objectives, determines how well students succeed in each given theme. Hence coming up with the type of assessment to be conducted is a very vital part of the formative evaluation procedure. For it to be highly effective, an assessment should be formative. That is, it should be able to respond to and also identify the needs of the learners. To ensure formative assessment is successfully attained, teachers always make an interactive and consistent assessment for student understanding (Shutter, 2014). This ultimately enables teachers to come to terms with

their teaching, therefore meeting their student's needs and helping them attain high standards. A study conducted by Fuchs & Fuchs (1986) carried out an analysis of 21 measured researches concerning the impacts of repeated determinative assessment on learners' performance from preschool through grade 12. From the studies, the teachers carried out formative assessments up to five times every week. The standard deviation for typical result scope was 0.70 for schoolrooms, which incorporated students to develop progress reports for every student and adjust instruction. Such studies indicate that learners in classrooms receiving structural recommendations and reports on graphical progress achieved better outcomes and improved more quickly than students in classrooms that have no structural recommendations and students within a controlled group.

Another study conducted by Bergan, Sladeczek, Schwarz, & Smith (1991) evaluated an in-structural planning system and an eight-week implementation of an assessment system for 838 kindergarten students who were highly affected by poverty. The students were required to exhibit their grasping of tough assignments in reading, science, and biology from the tasks. The teachers conducted the assessments every two weeks, after which they sought help from a researcher who helped them analyze and interpret the results obtained. The results would then help the teachers plan for instruction. Within two weeks, the use of assessment negatively affected placement and referrals to special education. Only one in every 17 students who took part in the experiment got a referral to special education.

2.2.3 Learning through Assignments and its effect on Students' Performance

Assignments are part of students' academic work, hence providing them with opportunities to learn and demonstrate they have attained their learning goals. The basic objective of giving assignments to students is the same as the general schooling objectives. It, however not clear whether the assignments can facilitate parents' participation in their kids' coursework. However, some investigators have concluded that assignments have an optimistic impact on families and parents by letting them pay some attention to their kids' educational development (Cates & Erkfritz, 2007). Assignments further seem to be more beneficial to older students than younger students whose benefits seem to be nonacademic. Teachers always use various instructing approaches to attain the academic requirements of their learners (Latif & Miles, 2011). To be successful, teachers always use different approaches to help their learners understand different concepts and provide options for independent classroom work. Assignments benefit the learners' studying and their performances (Latif & Miles, 2011). The educational resolution of assignments is to enable learners to obtain genuine information, advance their studying abilities, and help them learn anywhere. Not just within the school classroom or when the teacher is around.

Formative assignments are always used to develop the response that can be applied to develop both coaching and studying experience. In most cases, learners who seem to be struggling the most academically are often assessed compared to the rest since the continued assessments have been shown to improve their academic performance (Ajogbeje, 2012). Major assessments always serve the audience more as opposed to the learner. Therefore, feedback ends up reaching all stages within the scheme minus the one that tallies the learner most. Assignments are essentially designed to help professors better understand their student's academic performance while also assisting students in understanding the learning objectives of their lecturers.

3. Methodology

This research embraced a descriptive survey plan. The study was done in Siaya County, Kenya. Siaya County is located in the southwest region of Kenya and is among the counties found in the former Nyanza province. The target population in this research was 159 secondary schools, 159 principals, principals are stakeholders in implementing formative evaluation, 159 deputy principals, and 477 biology teachers, that was 3 biology teachers in each of the 159 secondary schools, biology teachers were key people among the target population as they helped in providing first-hand information as far as formative evaluation was concerned. Through the random sampling method, a sample of 30 respondents consisting of deputy principals, principals, and teachers was used to gather primary data. Questionnaires and face-to-face kinds of interviews were used in collecting information from all groups that were, principals, deputy principals, and biology teachers. Qualitative data were analyzed using content analysis. Quantitative data was analyzed using descriptive statistics and regression analysis.

4. Results and Discussion

4.1 Analysis of Feedback on Formative Evaluation

Descriptive analysis is one of the critical phases of statistical data analysis. It provides a clear conclusion on the distribution of data which helps in detecting errors and outliers (Mugenda & Mugenda, 2009). Descriptive Feedback on Formative Evaluation is presented in Table 1.

Table 1: Feedback on Formative Evaluation

Statement	SD	D	N	A	SA	Mean	Std Dev
Teachers Provide feedback to students.	0 (0.0%)	4 (2.3%)	18 (10.2%)	61 (34.5%)	94 (53.1%)	4.4	0.8
Teachers spend more time on a few selected assignments as opposed to grading every work done by students.	4 (2.3%)	26 (14.7%)	35 (19.8%)	68 (38.4%)	44 (24.9%)	3.7	1.1
Prompt feedback on formative evaluation informs students of their academic progress.	4 (1.1%)	11 (6.2%)	33 (18.6%)	75 (42.4%)	56 (31.6%)	4.0	0.9
Students usually obtain better grades when they work towards process objectives instead of product objectives and when following their development toward the general learning objective	0 (0.0%)	1 (0.6%)	45 (25.4%)	65 (36.7%)	66 (37.3%)	4.1	0.8
Overall score						**4.0**	**0.9**

The findings in Table 1 show that majority of respondents who were 155(84.6%) agreed with the statement that teachers provide feedback to students. A mean of 4.4 and a standard deviation of 0.8 provided support for this. This suggests that the majority of teachers provide their pupils with feedback, which is crucial for improving the student's academic performance. Results

corroborated those of Sato et al. (2018), who demonstrated that students who engaged in the feedback process answered comparable final test problems with greater quality.

Furthermore, a majority of the 112 respondents, or 63.3%, agreed with the assertion that teachers should devote more time to a small number of carefully chosen tasks rather than grading every piece of student work. A mean of 3.7 and a standard deviation of 1.1 provided evidence for this. This suggests that most teachers would rather devote more time to a small number of carefully chosen tasks, which is crucial for raising students' academic achievement. The results corroborated those of Sato et al. (2018), who demonstrated that students who engaged in the feedback process answered comparable final test problems with greater quality.

Further majority of the respondents who were 131 (74.0%) agreed with the statement that prompt feedback on formative evaluation informs students of their academic progress. A mean of 4.0 and a standard deviation of 0.9 provided evidence for this. One of the most important aspects of improving students' learning is formative feedback, which assists students in identifying knowledge gaps. The results of the study corroborated those of Leshem and Trafford (2007), who found that frequency, formative evaluation feedback, and formative evaluation itself all have an impact on biology learners' performance.

In addition, the majority of the respondents who were 131 (80.0%) agreed with the statement that students usually obtain better grades when they work towards process objectives instead of product objectives and when following their development towards the general learning objective. A mean of 4.1 and a standard deviation of 0.8 provided evidence for this. This is mostly explained by the distinction between process and product goals: the former defines success as the expansion of an individual's skill set, while the latter defines success as the completion of outstanding work. The results corroborated those of Andrade and Valtcheva (2009), who demonstrated that feedback helps students comprehend how their learning processes are going.

The overall mean of 4.0 with a standard deviation of 0.9 implied that majority of respondents were in agreement with statements relating to feedback on formative evaluation. The results highlight the value of formative assessment feedback in raising students' academic achievement. The results of the study corroborated those of Leshem and Trafford (2007), who found that frequency, formative evaluation feedback, and formative evaluation itself all have an impact on biology learners' performance.

These responses were supported by the responses provided by the principals. All 48 (100%) of the principals who were interviewed revealed that they usually offer formative assessments to their students. This denotes that all principals in Siaya engaged in formative assessments of their biology students. All 48 (100%) of the principals affirmed that feedback is provided to students after every assessment, the principals' responses revealed that feedback on the formative evaluation provides students an opportunity to evaluate themselves in terms of their understanding of the different topics. Feedback on formative evaluation helps students gauge their knowledge of particular subjects and recognize the knowledge gaps that they need to improve on. It therefore enables the students to know the topics that are challenging them the more and hence they can put more effort into the topics or seek help from the teachers. Further, feedback helps students know the strategies they need to adapt to enhance their learning on the subjects and topics that are more challenging to them. They are also able to know the support resources that they need to enhance their learning. Formative feedback according to the principals' responses helps the students understand what good performance is and hence they

can work towards that goal. Doing so leads to better grades in the subsequent assessments hence leading to a better performance in the subject.

These results were consistent with those of earlier research. For example, Nicol and Macfarlane-Dick (2006) emphasized the significance of customizing feedback to provide students with guidance on how to enhance their work instead of merely highlighting their mistakes. This was also consistent with the claims made by Fong et al. (2021) that positive reinforcement motivates students to pursue personal growth and realize their greatest potential. Teachers can foster a sense of confidence and self-assurance in their students' talents by offering assistance and recognizing their strengths. This has a good impact on the student's performance as a whole.

4.2 Analysis on Frequency of Formative Evaluation

Descriptive analysis is one of the critical phases of statistical data analysis. It provides a clear conclusion on the distribution of data which helps in detecting errors and outliers (Mugenda & Mugenda, 2009).

Table 2: Frequency of Formative Evaluation

	SD	D	N	A	SA	Mean	Std Dev
Reports, formative assessments, and structural recommendations are used to facilitate peer-to-peer instruction, address more skills, and also enhance one-on-one instruction.	0 (0.0%)	5 (2.8%)	32 (18.1%)	58 (32.8%)	82 (46.3%)	4.2	0.8
The frequency of formative evaluation through progress observation has been shown to positively impact students' progress.	0 (0.0%)	6 (3.4%)	17 (9.6%)	70 (39.5%)	84 (47.5%)	4.3	0.8
Teachers actively involve students in assisting them in developing skills that will enable them to learn better	0 (0.0%)	2 (1.1%)	32 (18.1%)	61 (34.5%)	82 (46.3%)	4.3	0.8
Overall score						**4.3**	**0.8**

The findings in Table 2 reveal that majority of respondents agreed with the statement that 140(79.1%) agreed with the statement that reports, formative assessments, and structural recommendations are used to facilitate peer-to-peer instruction, address more skills, and also enhance one-on-one instruction. This was supported by a mean of 4.2 and a standard deviation of 0.8. This infers that most of the teachers used reports, formative assessments, and structural recommendations are used to facilitate peer-to-peer instruction. The majority of the 154 respondents (87.0%) agreed with the statement that pupils' progress has been positively impacted by formative evaluations and progress monitoring frequency. A mean of 4.3 and a standard deviation of 0.8 provided evidence for this. This suggests that the majority of Siaya County's biology teachers provide formative assessments to their pupils, which hastens the students' academic development. These results were in line with those of Hupert et al. (2007),

who discovered that students performed better in biology the more often formative assessments were given.

Further, majority of the respondents who were 143 (80.8%) agreed with the statement that teachers actively involve students in assisting them in developing skills that will enable them to learn better. A mean of 4.3 and a standard deviation of 0.8 provided evidence for this. This suggests that the majority of Siaya County's biology professors help their pupils acquire new abilities. These results were in line with those of Hupert et al. (2007), who discovered that students performed better in biology the more often formative assessments were given. Findings concurred with Sahoo, et al. (2023) who found a significant correlation between the weekly formative assessment.

The overall mean of 4.3 with a standard deviation of 0.8 implied that majority of respondents were in agreement with statements relating to the frequency of formative evaluation. The outcomes point to the importance of the frequency of formative evaluation in enhancing learners' academic performance. These results were in line with those of Hupert et al. (2007), who discovered that students performed better in biology the more often formative assessments were given.

According to principals' responses 48 (100%), more frequent formative evaluation provides students with vast opportunities for enhancing their performances. The students have more opportunities to get involved and committed to learning. According to the principals, more frequent formative evaluation helps them to get better grades than less frequent formative assessments. However, according to the principals' responses, 48 (100%) more frequent formative assessments can take more time leading to the students not having enough time for teaching. The principals hence highlighted the need to moderate the frequency of formative evaluation. This can be attributed to the fact that formative assessments are designed to offer feedback about what students need which then drive stronger student performance. Hupert et al. (2007) discovered that students performed better in biology the more often formative assessments were given. These results were consistent with their findings.

4.3 Analysis of Learning through Assignments

Descriptive analysis is one of the critical phases of statistical data analysis. It provides a clear conclusion on the distribution of data which helps in detecting errors and outliers (Mugenda & Mugenda, 2009). Descriptive for learning through assignments were presented in Table 3.

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Table 3: Learning through Assignments

Assignments	SD	D	N	A	SA	Mean	Std Dev
Assessments allow students to improve and revise their thinking and aid them observe their development over time.	0 (0.0%)	0 (0.0%)	32 (18.1%)	67 (37.9%)	78 (44.1%)	4.3	0.7
We use modified assessments frequently to improve students' learning outcomes.	0 (0.0%)	8 (4.5%)	16 (9.0%)	67 (37.9%)	86 (48.6%)	4.3	0.8
Regular evaluation of students' performance has been shown to enhance student performance.	0 (0.0%)	3 (1.7%)	14 (7.9%)	63 (35.6%)	97 (54.8%)	4.4	0.7
Teachers employ assignment tests as a formative assessment method to assess learners' progress in performance in Biology.	0 (0.0%)	5 (2.8%)	44 (24.9%)	65 (25.4%)	83 (46.9%)	4.2	0.9
Overall score						**4.3**	**0.8**

The findings in Table 3 indicate that respondents 145(82%) agreed with the statement that assessments allow students to improve and revise their thinking and aid them observe their development over time. A mean of 4.3 and a standard deviation of 0.7 provided evidence for this. This suggests that biology teachers help their students develop and refine their ideas, enabling them to go over what they have learned more than once, look at it from other perspectives, and progressively lengthen the time between reviews. The results supported the claim that teachers routinely employ customized tests to enhance students' learning outcomes. Of the 153 respondents, 86.5% agreed with this assertion. A mean of 4.3 and a standard deviation of 0.8 provided evidence for this. The study findings agreed with Ajogbeje (2012) who indicated that assignments are meant to help teachers understand their students better as far as their academic performance is concerned while at the same time helping the students understand their teachers' learning intentions.

Further, the findings reveal that respondents strongly agreed (54.8%) and agreed (35.69%) that conducting frequent assessments of students' performance has proved to improve students' outcomes. A mean of 4.4 and a standard deviation of 0.7 provided evidence for this. By connecting student performance to particular learning objectives, teachers can assess the efficacy of their instruction by regularly assessing students' performance. Furthermore, the findings show that respondents agreed (25.4%) and strongly agreed (46.9%) that teachers use assignment tests as a formative assessment tool to gauge students' performance growth in biology. A mean of 4.2 and a standard deviation of 0.9 provided evidence for this. This suggests that the majority of biology professors use assignment assessments as a formative evaluation tool to gauge their students' advancement. These results corroborated those of Haq, Shakil, and Din (2020), who discovered that homework affects students' learning and has a significant

impact on their academic performance. This was also in line with the findings of James, Odo, and Nnaemeka (2017), who found that students' performance on take-home tests affects their performance in mathematics.

The overall mean of 4.3 with a standard deviation of 0.8 implied that majority of respondents were in agreement with statements relating to learning through assignments. The findings document the importance of employing assignment tests as a formative assessment method to assess learners' progress in performance. The study findings agreed with Ajogbeje (2012) who indicated that assignments are meant to help teachers understand their students better as far as their academic performance is concerned while at the same time helping the students understand their teachers' learning intentions.

The outcomes showed 45 (93.75%) of responses from the interview schedule with the principals revealed that assignments increase students' engagement in learning. Assignments also lead to positive educational outcomes. Assignments provide teachers with opportunities to provide guiding questions to the students to enhance their understanding of the subjects. Assignments also help students prepare for the main examinations. According to the principals, the teachers provide students with questions that enable them to revise the related topic and which enables them to prepare for the final term examinations. Further, 45 (93.75%) of principals also indicated that assignments help the students to do further reading which harnesses what they are taught in class. Sometimes teachers give assignments to the students on topics that they intend to teach next. This helps the students with studying particular topics before the actual class lesson. This enhances the student's understanding of the topic. They also stated that the assignments helped the students to utilize their free time in learning which also helped them attain better grades.

Songsirisak and Jitpranee's (2019) research, which indicated that homework had some psychological effects on students' learning and interfered with their ability to manage their free time, however, helped and supported students' learning, was consistent with this. Students' academic achievement grew, their learning skills were developed, and they were able to gain knowledge. Additionally, it encouraged students to work cooperatively and to communicate with teachers to clarify assignments.

4.4 Regression Analysis

Regression analysis was done to determine the relationship between the independent variables (feedback on formative evaluation, frequency of formative evaluation as well as learning through assignments) and the dependent variable (learners' academic performance).

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.733a	0.537	0.529	0.12162

a Predictors: (Constant), Assignments, Feedback, Frequency

The results presented in Table 4 showed that feedback on formative evaluation, frequency on formative evaluation as well as learning through assignments together were found to be satisfactory variables in explaining learners' academic performance. This indicates that 53.7% of the variations in the dependent variable, which is learners' academic performance, can be explained by feedback on formative evaluation, frequency on formative evaluation, and learning through assignments. This result emphasizes even more how appropriate the model was that was used to associate the relationships between the parts.

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Table 5: Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.97	3	0.99	66.923	.000b
	Residual	2.559	173	0.015		
	Total	5.529	176			

a Dependent Variable: Performance

b Predictors: (Constant), Assignments, Feedback, Frequency

Table 5 indicated that feedback on formative evaluation, frequency of formative evaluation as well as learning through assignments were a good predictor of learners' academic performance as represented by an F statistic of 66.923 and the reported p-value of 0.000<0.05. This implies that the feedback on formative evaluation, frequency of formative evaluation as well as learning through assignments have statistically significant effects on learners' academic performance.

Table 6: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.131	0.096		-1.37	0.172
	Feedback	0.127	0.027	0.326	4.643	0.000
	Frequency	0.085	0.03	0.235	2.833	0.005
	Assignments	0.108	0.028	0.284	3.905	0.000

a Dependent Variable: Performance

The study findings showed that feedback on formative evaluation had a positive and significant relationship with Learners' academic performance in biology (β=0.326, p=0.000). This infers that an increase in feedback on formative evaluation would enhance learners' academic performance by 0.326. Findings agreed with Andrade and Valtcheva (2009) who showed that feedback enables students to understand how they are progressing in their learning processes. The results corroborated those of Sato et al. (2018), who demonstrated that students who engaged in the feedback process answered comparable final test problems with greater quality. It also concurred with Batool and Akhter (2019) who found a significant effect of feedback on students' achievement in mathematics.

Outcomes further showed that the frequency of formative evaluation had a positive and significant relationship with Learners' academic performance in biology (r=0.235, p=0.005). This infers that an increase in the frequency of formative evaluation would enhance learners' academic performance by 0.235. These results corroborated those of Hupert, Heinze, Gunn, Stewart, and Honey (2007), who discovered that students' performance in biology increased with the frequency of formative assessments. Findings also agree with Gjerustad and Opheim (2014) who established that the frequency of assessment is connected to academic performance. The study also concurred with Owiti (2023) who demonstrated that frequent formative evaluation has a positive effect on student results. This however disagreed with Bulut et al. (2023) who found that increasing the frequency of formative assessments did not improve

student performance and Guven (2017) who found that quizzing frequency is not a significant contributor to student achievement in eighth-grade mathematics.

Further outcomes showed that learning through assignments had a positive and significant relationship with learners' academic performance in biology (r=0.284, p=0.000). This infers that an increase in assignments together with group discussions would enhance learners' academic performance by 0.284. The study findings agreed with Ajogbeje (2012) who indicated that assignments are meant to help teachers understand their students better as far as their academic performance is concerned while at the same time helping the students understand their teachers' learning intentions. This was also in line with the findings of Haq, Shakil, and Din (2020), who discovered that homework affects students' learning and has a significant impact on their academic performance. This was also in line with the findings of James, Odo, and Nnaemeka (2017), who found that students' performance on take-home tests affects their performance in mathematics.

5. Conclusion

5.1 Feedback on Formative Evaluation and performance of learners

The study concluded that feedback on formative evaluation had a positive and significant relationship with Learners' academic performance in biology. The study further concluded that providing students with feedback enhanced their learning. Responses assisted the students in recognizing their weak points and devising strategies to strengthen them in their coursework. Feedback-received students had better academic advancement. They appreciated and were pleased with the feedback sessions.

5.2 Frequency on Formative Evaluation and Performance of Learners

The study concluded that the frequency of formative evaluation had a positive and significant relationship with Learners' academic performance in biology. The study also finds that regular formative assessment helps teachers better support all students in meeting high expectations by allowing them to modify their instruction to fit the needs of each student. It was discovered that there was a relationship between students' academic performance and the frequency of teacher evaluations as well as the amount of time teachers spent grading assignments and tests.

5.3 Effect of Learning through Assignments on Performance of Learners

The study concluded that learning through assignments had a positive and significant relationship with Learners' academic performance in biology. The results of the study show that biology teachers use homework assignments and exams as a formative assessment approach to determine how well their students are doing on the topic, which is an important part of the learning process. Frequent formative assessment of students' work has also been shown to boost academic achievement.

6. Recommendations

6.1 Feedback on Formative Evaluation and performance of learners

From the study findings, feedback on formative evaluation had a positive and significant relationship with Learners' academic performance in biology. Feedback on formative evaluation has proved to be an effective teaching technique for biology students. To increase openness in the learning process and set an example for students on how to acquire new skills, good feedback should be connected to explicit expectations for students' performance. Additionally, feedback needs to be provided precisely, on time, and with suggestions for how to improve moving forward. All students should benefit from the favorable social and

environmental circumstances in which biology professors conduct formative assessments and provide feedback to pupils. The academic achievement of the students would improve as a result.

6.2 Frequency on Formative Evaluation and Performance of Learners

From the study findings, frequency on formative evaluation had a positive and significant relationship with Learners' academic performance in biology. In classrooms equipped with formative assessment tools, teachers should regularly and interactively evaluate students' understanding. This enables them to better help all children reach high expectations by tailoring their curriculum to each student's requirements.

6.3 Effect of Learning through Assignments on Performance of Learners

From the study findings, the frequency of learning through assignments had a positive and significant relationship with Learners' academic performance in biology. Teachers of biology in secondary schools should so carefully prepare biology assignments, homework, and classroom-supervised math work to boost students' interest in the subject and advance their academic performance.

6.4 Recommendations for Policy

Curriculum designers need to remember that learning biology involves more than just cognitive when creating assignments for students. Therefore, the design of the biology curriculum should incorporate the utilization of techniques, approaches, and educational materials that will make the study of biology highly engaging, inquisitive, and daring.

To improve teacher performance and equip them with the skills needed to create formative assessments and integrate them into classroom procedures, the government and school administrators ought to permit and incentivize teachers to attend seminars, workshops, conferences, and in-service training.

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