**Original Research Article**

**Examining Students’ Study Habits and Their Impact on Chemistry Examination Performance in Bungoma County, Kenya**

# ABSTRACT

The role of STEM education is key in attainment of Kenya’s Vision 2030, which prioritizes Science, Technology and Innovation. Within STEM, Chemistry serves as one of the major disciplines yet its performance has remained low. This study aimed at investigated the relationship between students' study habits and performance in Chemistry examinations. Using qualitative and quantitative approaches, the study employed descriptive correlational research designs. A census approach was used to include all the 8 Sub-counties in Bungoma County, one school from each Sub-county was then purposively selected based on school categories. The sample size of 260 students from the target population 790 form 4 students was derived by Morgan’s table. Proportionate allocation sampling by Kothari was then applied to allocate the sample size across schools. Structured questionnaire was used to collect data on students’ study habits and documentary review guide to collect data on students’ chemistry exam scores. The collected data was analyzed using Statistical Package for Social Sciences (SPSS). Descriptive statistics revealed study habit mean of M = 3.15, indicating a moderate engagement of students with appropriate study habits. A significant positive correlation was (r = 0.624, p < 0.001), implying that employing appropriate study habits by students improves their performance in Chemistry examination. Regression analysis (b = 0.203) showed that a unit increase in appropriate study habits resulted in a 20.3% improvement in performance in chemistry examinations. The study concluded that students study habits have a direct role in influencing their performance in chemistry examinations. The study recommended an emphasis on ‘learning to learn’ competency by incorporating study efficiency techniques into weekly guiding and counseling sessions in schools. Teachers should also honor students’ scheduled revision time, allowing them to have supervised revision.

*Key Words: Study habits, Performance, Chemistry, Bungoma County*

# INTRODUCTION

The role of STEM as a foundation of innovation and national development is key, especially in Kenya’s pursuit of vision 2030 that emphasize Science, Technology and Innovation as one of the key drivers of the economy towards industrialization by the year 2030 (Otieno et al., 2020). Chemistry as one of the main disciplines within STEM often serve as a gateway to advanced studies in fields essential for industrial and technological progress.

Despite its notable benefits, performance in chemistry examinations has been a challenge (Enekwechi et al., 2021; KNEC, 2010; Ogembo, 2012; Omenka et al, 2021). Several studies have looked at factors leading to poor performance in Chemistry examinations, but the problem still persists (Otieno et al., 2020; Enekwechi et al, 2021; Ogembo, 2012; Omenka et al., 2021). This is evident in Table 1, showing how performance in chemistry (Mean = 2.2796, Grade D-) compared with other subjects in 2024 Catholic Secondary Schools Principals Association (CaSPA) Mock exam done by more than 200 Catholic Church sponsored Secondary Schools in Bungoma Diocese.

**Table 1: *2024 Bungoma Diocese CaSPA Mock Examination Mean Scores (out of 12 Points)***

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SUBJECT** | ENGLISH | KISWAHILI | MATHEMATICS | BIOLOGY | PHYSICS | **CHEMISTRY** | GEOGGRAPHY | HISTORY | CHRISTIAN RELIGIOUS EDUC | COMPUTER STUDIES | AGRICULTURE | HOME SCIENCE | BUILDING & CONSTRUCTION | BUSINESS STUDIES | ART & DESIGN | FRANCH | MUSUC |
| **MEAN** | 2.8731 | 3.9721 | 2.6615 | 4.0356 | 5.2006 | **2.2796** | 4.3122 | 3.4958 | 5.1154 | 4.8935 | 2.4671 | 4.9115 | 2.3787 | 2.5284 | 5.1400 | 4.5131 | 5.0514 |
| **GRADE** | D | D+ | D | D+ | C- | **D-** | D+ | D | C | C | D+ | C | D+ | D | C- | C- | C- |

The problem of low performance in chemistry needs to be approached from a different perspective by investigating students’ related factors. This is because in a classroom, teachers use one curriculum designs, similar teaching and learning resources and similar classroom instructions materials to all students, but a wide range of difference is observed in students’ academic achievement even in the same classroom.

This necessitated the need for this study to look at students’ related factors, considering Barry Zimmerman’s

Self-Regulated Learning (SRL) theory which views learners as active participants in their own learning

processes. According to Abulude (2009) in his unpublished dissertation, affiliate of the Usman Dan Fodio

University Sokoto, students’ related factors assume a significant part in their choice to learn Chemistry.

One of such significant factor with respect to achievement are their study-habit (Uchenna & Edidiong, 2020).

Students need to impress proper study habits for them to understand Chemistry concepts and realize better

performance (Osa-Edoh & Alutu, 2012).

Study habits are patterns of behavior adopted by students in their pursuit of studies that serves as the vehicle of learning (Mendezebal, 2013). Azikwe as quoted by Akporehwe and Billy (2018) similarly describes study habits as the adopted way and manner a students’ plans his/her private readings after classroom learning so as to attain mastery of the subjects.

Fazal (2012) identified study skills used by learners and ascertain which study skills are more related to academic achievement. Results of his study indicated significant relationship of time-management skills and note-taking skills with academic achievement. He noted that students with higher academic achievement uses a wide range of study skills as compared to students with lower academic achievement. Nonis and Hudson (2010) in their study on performance of college students-impact of study habits established that some study habits had a positive direct relationship on students’ performance but others had a negative direct relationship. They noted that study time correlates with students’ performance positively,

Crede and Kuncel as quoted by Siahi and Maiyo (2015) looked at the relationship between study skills and academic performance of university students. They found that study habit skill, among other attitudinal constructs, accounted for incremental variance in academic performance beyond standardized tests and previous grades. They opined that for good academic success, good study habits are key. According to Menzel, cited by Siahi and Maiyo (2015), lots of students perform poorly not because they lack ability but because they do not have adequate study skills.

Mutsotso and Abenga (2010) in their study on study methods for improving quality learning and performance in higher education had a similar sentiments, though put differently. They noted that how much an individual student achieves in part dependent on the study methods that s/he uses. According to them, there is no one study method that works better for all learners and instead one needs to identify personal study methods that work for each individual in given environments, conditions and circumstances. Several other studies also found a positive correlation between study habits and academic performance. Among them are; Bhatta (2009); Parua and Archana (2011); Riaz, Aisha and Kiran (2002); Sivakumar (2009) and Chaudhari (2013).

Nuthana and Yenagi (2009) also found significant correlation between study habits and academic achievement. According to them, reading and summary note-taking habits, habits of concentration, and preparation for examination has significant correlation with academic achievement. They concluded that students who are better in reading and note-taking, well prepared for the examination and their concentration leads to better academic achievement.

On having a personal study timetable and strictly sticking on it during revision, Osa-Edoh and Alutu (2012) established that students usually do not devote sufficient time to their personal studies timetable. They noted these by examining the usefulness of imbibing in the students study habit, as a means of enhancing their academic performance, a high correlation between study habits and students’ academic performance was revealed.

Shyiramunda (2023) carried out a study on relevance of group discussion method for chemistry learning in an action research. Using qualitative and quantitative descriptive research design, he found out that group discussion learning creates a real connection between students and the learning environment where students engage, collaborate, and discuss learning content, thereby benefiting from each other's teaching and learning. They concluded that group discussions were effective in improving students' performance in chemistry.

On the contrary, O’Neala and Harrison (2013) in their study on investigation of learning styles and study habits of chemistry undergraduates in Barbados found out that the contribution of the learning styles and study habits as predictors of a chemistry student’s academic achievement in group theory was not significant. Similarly, Lalhruaitluangi et al. (2020) study on study habits and academic achievement of high school students in Lunglei district in India, using descriptive research design with Stratified random sampling found no significant relationship between study habit and academic achievement of high school students. This partly motivated the need for this study, using different methodological scope to be carried out in Bungoma County, a County in a Country with different geographical scope but similar challenges in performance in chemistry examinations. By addressing poor performance in chemistry examination, stakeholders in education can develop targeted interventions to enhance learning outcomes in chemistry to help the country attain vision 2030, a goal that emphasize Science, Technology and Innovation as one of the key drivers of the economy towards industrialization.

## **Statement of the Problem**

The government of Kenya through the Ministry of Education has tried to put in place several measures aimed at improving performance in chemistry, given its notable benefits especially in pursuit of vision 2030 that emphasizes science and technology as one of the key drivers of the economy towards industrialization. Among the measures put in place is SMASSE (Strengthen Mathematics and Science in Secondary School Education) program put in place with the assistance of the government of Japan through Japan International Cooperation Agency (JICA) to boost performance of Chemistry in Kenya (Juma, 2018). Despite the efforts, performance in Chemistry still remains low (KNEC, 2005, Ogembo (2012). It was the researcher’s desire to address low performance in chemistry that created an interest to look at the effect of students’ study habits on performance in chemistry examination in Secondary school of Bungoma County in Kenya.

## **Theoretical Framework**

This study was grounded primarily in Self-Regulated Learning (SRL) Theory by Barry Zimmerman, which views students as active participants in their own learning processes. According to SRL, learners set goals, plan strategically, monitor their progress, and reflect on outcomes behaviors that align well with practices like using revision timetables, managing study time, taking summary notes, and participating in discussions.

Other supportive theories were integrated. Social Constructivism proposed by Vygotsky was used given its support of group discussions in the revision process. The concept of time management drew from Performance and Psychological frameworks that emphasize planning, scheduling, and prioritizing as key competencies. To support the practice of summary note-taking, Cognitive Load Theory by John Sweller which suggests that learners perform better when instructional material reduces unnecessary mental effort and allows more cognitive resources to process and store key ideas was integrated. Taken together, these theoretical perspectives explain how students who engage in group discussions, manage their time wisely, follow structured revision plans, and take effective notes can better regulate their learning and, consequently, perform better in chemistry exams.

# METHODOLOGY

This study employed both qualitative and quantitative research approaches. The researcher used quantitative approach to systematically measure and quantify students' perspectives on their study habits, while qualitative approach complemented quantitative approach by capturing deeper insights into students' thoughts, perceptions, and experiences regarding their performance in chemistry. Correlational research design was employed to establish the relationship between students’ study habits and performance in Chemistry examination. A census approach was used to include all the 8 Sub-counties in Bungoma County. Purposive sampling technique was then used to choose on eight participating schools, one from each Sub-county based on their categories. Schools were chosen based on; 2 boys' boarding schools, 2 girls' boarding schools, 2 mixed both boarding and day school and 2 mixed only day school. One more school from Bungoma Township was selected from the County headquarters, giving a total of 9 schools. Simple random sampling technique was finally used to get respondents from the selected schools.

The total population for the study in Bungoma County was 21,656 Kenya Certificate of Secondary Education (KCSE) registered candidates (Bungoma County Educational office enrolment statistics).The researcher purposively targeted 9 public secondary schools with a population of 790 form four students. From the 790 target population, Morgan’s sample size determination table was employed, resulting in a final sample of 260 students. Proportionate allocation sampling formula by **Kothari (2004)** was then applied to distribute the sample effectively across the selected schools. This ensured that each school contributed a proportional number of students based on its overall student population.

The study employed questionnaire to collect data on students’ study habits and documentary review guide to collect data on students’ chemistry exam scores, then the collected data was analyzed using Pearson’s correlation to establish the linear relationship between students study habits and students’ performance in Chemistry in Bungoma County. Simple regression analysis was then used to examine the effect of students’ study habit on their performance in chemistry. Qualitative data helped to complement quantitative data by capturing students' perceptions and experiences regarding the challenges they face in relation to that chemistry.

# RESULTS

Firstly, the study assessed the extent of students’ study habits while revising chemistry in secondary schools of Bungoma County. The results are as shown in Table 2.

# Tables 2: *Students’ Study Habits Means*

|  |  |  |  |
| --- | --- | --- | --- |
| Factor | Mean | SD | Level |
| Study Habit |  |  |  |
| Short notes taking whenever revising Chemistry  Time management while revising chemistry | 3.19  3.19 | 1.51  1.19 | Moderate  Moderate |
| Adherence to chemistry personal revision timetable | 3.26 | 1.36 | Moderate |
| Discussion of chemistry with other students in groups | 2.96 | 1.46 | Moderate |
| Aggregate mean and SD | 3.15 | 1.38 | Moderate |

***Legend****: 4.20-5.00., (Very High), 3.40 -4.19, (High), 2.60- 3.39 (Moderate), 1.80- 2.59 (Low), 1.00- 1.79 (Very Low).*

The findings in Table 2 indicate a moderate mean on summary notes taking (M = 3.19, SD = 1.51), moderate mean on time management while revising chemistry (M = 3.19, SD = 1.19), moderate mean on strict adherence to personal revision timetable (M = 3.26, SD = 1.36) and moderate mean on chemistry group discussion (M = 2.96, SD = 1.38). The aggregate mean was moderate for students’ study habits (M = 3.15, SD = 1.38).

The collected data was then analyzed by Pearson Correlation in order to establish the relationship between students’ study habits and performance in Chemistry examination. The results are given in the Table 3.

# Table 3: *Correlation Coefficient Relating Students’ Study Habits to Performance in Chemistry Examination*

|  |  |  |
| --- | --- | --- |
| **Variable** | **Students’ study habits** | |
| *(r)* | p-value |
| Chemistry  Performance | .624 | .000 |

Legend: Correlation is significant at 0.05 level (2-tailed)

Results in Table 3 shows the coefficient of correlation for students study habits and performance in Chemistry examinations. The results show a moderate, highly significant positive correlation between students’ study habits and students chemistry performance (r = .624 and P= 0.000).

The study also sort to establish the influence of the students’ study habits on performance in Chemistry examination. To achieve this, linear regression was conducted and results presented in Table 4.

# Table 4: *Regression analysis; Contribution of Students’ Study Habits on Performance in Chemistry Examination*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable |  |  |  | | |
| Std. Error | Beta | | P-value | Interpretation |
| Study habit | .061 | .203 | | .001 | Significant |

Constant = .971 R= .663 R2 = .439 F-ratio = 33.008

The analysis in Table 4 show beta coefficient (β) = .203, and P-value (P) = .001, indicating students study habit as significant predicator of performance in chemistry examination.

# DISCUSSION

The findings on extent of study habits in Table 2 indicate a moderate mean (Mean = 3.15) implying that students in Bungoma County often engage in appropriate study habits. They acknowledged that while revising Chemistry, they often manage their revision time well, revise according to Chemistry timetable and make short summary note while revising. However, to a lesser extent they discus Chemistry with their classmates (Mean = 2.96), citing lack of adequate time. This was noted by several respondents in the open responses. This is what one of them had to say:

*We don’t have enough time for group discussions given the tight school schedule with teachers occupying us all through.*

Siahi and Maiyo (2015) also had similar findings. They recorded that 48.2% of the students in their study had average study habits with 25.9% of them reporting unsatisfactory study habits. Their mean was found to be 55.33% on study habits.

The implication to this moderate mean on extent of study habits is that, although some students have impressed some appropriate study habits, they are only using them to some extent, thus contributing to low performance in Chemistry examinations. This is supported by Osa-Edoh and Alutu (2012) who augured that students who have improper study habits normally perform poorly academically. These sentiments were reinforced by Nonis (2006) who opined that it is not all about time a student spends studying, but also how effectively the time is spend and study strategies engaged that influences academic performance. Osa-Edoh and Alutu (2012) similarly concur in their study. They noted that it is only when students imbibe or cultivate proper study habits that their academic performance can be improved.

Table 3 shows a positive and highly significant (r = .624 and P = 0.000) coefficient of correlation for students study habits and performance in Chemistry examination. Similarly, Siahi and Maiyo (2015) in their study on the relationship between study habits and academic achievement found a positive and significant relationship between study habits and academic achievement (r = 0.66). Anwar (2013) in his study on a correlational study of academic and study habits also found a positive and significant relationship between study habits and academic achievement (r = 0.695). The implication of these findings is that as students employ better study habits, their performance in chemistry examination tends to improve. This reveals why students in Bungoma County have not been performing well in chemistry examinations considering their moderate mean on study habits.

In Table 4, students’ study habits were significant predictor of performance in Chemistry. Students’ study habits were positive and lowly significant (beta = .203, P = .001). This means that for every unit increase in appropriate study habit, it translates to 20.3% increase of performance in Chemistry examination. Siahi and Maiyo (2015) findings also showed a positive index. This means that as students improve on their study habits, their chemistry academic achievement tends to increase, and vice versa. This finding concur with Crede and Kuncel (2008), in their study. They opined that appropriate study habit skill accounted for incremental variance in academic performance beyond students’ previous grades.

# CONCLUSION

The study concluded that students study habits have a direct influence on their performance in chemistry examinations. **The significant positive correlation between study habits and performance in chemistry examinations suggests that students who adopt effective learning strategies tend to achieve higher scores in chemistry examinations. The regression analysis further more indicates that study habits have a measurable impact on chemistry examination performance, reinforcing the importance of students’ role in their academic achievement. Overall, the study affirms that deliberate and well-organized study habits are instrumental in fostering better performance in chemistry examinations among students in Bungoma County in Kenya.**

# RECOMMENDATIONS

This study recommends an emphasis on ‘learning to learn’ competency by incorporating study efficiency techniques into weekly guiding and counseling sessions in schools.

Teachers should also honor students’ scheduled revision time, allowing them to have supervised revision rather than using that time to teach.

**Teachers should help students** identify their personal study methods that work best for them in given environments, conditions and circumstances and find ways and means of enhancing them among students.

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