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Relationship Between Religion and Secondary School Students' Performance in Chemistry in Samburu County, Kenya

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Abstract

Purpose: The purpose of this study was to determine the relationship between Religion and secondary school students' performance in chemistry. In addition to the main purpose, the study sought to investigate the relationship between religion and secondary school students' performance in chemistry in Samburu County.

Materials and Methods: Descriptive Correlational survey research design was used. The target population was all the secondary school chemistry students in Samburu County. The accessible population was all the Form Three chemistry students in the County in the year 2024. Cluster sampling was used to select nine secondary schools as sampling units. This included both public and private schools. Stratified and simple random sampling was used to select a sample of 282 students. Two instruments were used for data collection namely: Students' Chemistry Performance Test (SCPT) and Students' Religion Questionnaire (SRQ). The instruments for data collection were validated by five experts in educational research. The reliability coefficient of SCPT and SRQ was estimated using Guttman's Lambda (**λ6**) formula. This yielded a reliability coefficient of 0.78 and 0.81 respectively. The data collected was analyzed using both descriptive and inferential statistics. Simple Linear Regression was used to establish the relationships between the different variables in the study. All statistical tests of significance were conducted at a coefficient level of alpha (**α**) equal to 0.05 with the help of Statistical Package for Social Sciences (SPSS) version 23.0 for windows.

Findings: The findings indicate that there was a statistically significant relationship between Religion and students' performance in chemistry. The findings of this study would also benefit chemistry teachers, curriculum developers, teacher educators, spiritual leaders and policy makers in addressing necessary interventions to facilitate meaningful learning of chemistry and thus improve students' performance in chemistry in secondary schools Countrywide.

Unique Contribution to Theory, Practice and Policy: It is recommended that the Ministry of Education should initiate in-service courses for all science teachers to equip themselves with relevant skills to enhance their effectiveness in teaching of chemistry and science subjects in general.

Keywords: *Relationship, Religion, Students' Performance, Chemistry*

INTRODUCTION

The problem of students' under-performance in secondary schools in Samburu County has been a much discussed educational issue. In solving any problem however, it is pertinent to understand the causes of such problems. Many causes or agents have been studied as the etiological starting point for investigating the phenomena of students failure or success. Culture has received considerable attention in science education. Culture depicts a people's peculiar pattern of values, attitudes, knowledge, skills, behaviours and technology (Irungu, 2019). Culture refers to the sum total of the learned behaviours of a group of people that were generally considered as their tradition and was transmitted from generation to generation in various forms (Ogunleye, 2009). Cultural differences and characteristics manifest themselves in different domains and at varying depths. Applying UNESCO's general definition, domains of culture include spiritual, material, intellectual and emotional features of a society or a group, in addition to their art and literature, lifestyles, way of living together, value system, traditions and beliefs (Nnamani & Oyibe, 2016). The assumptions that culture was the primary determinant of academic performance could be dangerous and counterproductive if misinterpreted (Palt, 2018).

Cultural knowledge takes many forms such as taboos, rituals, norms, beliefs and cultural practices depending on the particular historical and cultural background. According to Kei (2011), education was influenced by the prevailing economic, social, technical, religious and political systems. Cultural traditions were used to sustain community development and also advancement in technology. In support of this, the former president of Tanzania, Mwalimu Julius Nyerere, described Cultural education as an integral part of life (Kigotho, 2015).

Chemistry is a science subject taught in secondary schools. It relates with both physical and chemical phenomena, and how they were connected to man's daily lives. There was, therefore, a likelihood of religious beliefs having an influence on students' performance in chemistry. It was, therefore, pertinent that chemistry teachers assist their students to use their knowledge in ways that draw on their religious experiences for meaningful learning to take place. In response to the dismal results of students' performance in the sciences and mathematics, the Kenyan government, through the Ministry of Education, Science and Technology (MoEST), with assistance from the Japanese government through the Japan International Corporation Agency (JICA), launched the Program for the Strengthening of Mathematics and Science in Secondary Education (SMASSE) (Nwona, 2015). In Samburu County, the program was implemented, and a notable improvement was observed. Nevertheless, as Table 1 shows, despite this intervention, students' performance in these subjects particularly chemistry among the sciences remained below 50% (KNEC Report, 2024).

Table 1: Samburu County Students' Performance in 2022 to 2024 KCSE Examinations in Sciences

Subject	2022				2023				2024			
	Female No. Sat.	Mean %	Male No. Sat.	Mean %	Female No. Sat.	Mean %	Male No. Sat.	Mean %	Female No. Sat.	Mean %	Male No. Sat.	Mean %
Biology	501	26.51	682	27.11	640	37.60	708	40.50	770	47.56	820	47.60
Physics	93	24.08	350	29.67	97	32.25	270	35.50	282	32.06	320	45.67
Chemistry	540	17.90	830	24.56	720	26.20	840	29.05	860	27.13	940	39.89

Source: County Education Office, Maralal

Two conclusions may be drawn from Table 1:

i. Boys' and girls' chemistry performance over the given period was below average (50%).

ii. Despite the fact that both boys' and girls' performance fluctuated, it was clear that there was a gender difference in performance: girls' scores were consistently lower than boys', primarily in the area of chemistry.

Several variables have been suggested as the cause of Chemistry's poor performance. These included the excessive number of students enrolled, the students' disinterest in the subject, the lack of resources, the parents' educational background and socioeconomic standing (Koul, 2017). Through its several branches, Kenya's Ministry of Education has worked hard to lessen the reasons behind students' subpar performance in chemistry. These initiatives included, among other things, setting up in-service training programs for chemistry teachers, providing basic training materials, and, on occasion, revising the secondary school curriculum. Students continue to do poorly in chemistry despite the aforementioned initiatives (KNEC, 2020). This implied that the problem that caused the students to perform poorly in the course had not been fully resolved. Although the previously indicated factors may have contributed to this type of achievement, there may have been other, more significant factors as well. Research has shown that cultural factors affect how well students do in science classes and, in turn, in chemistry classes (Irungu, 2019).

There was a gender gap in the chemistry performance of the students, as Table 1 shows. Numerous academics have determined that attitude-related variables, including low self-esteem, a negative self-concept, fear of failure, cultural impact, and insecurity, affect how well girls perform in math and science (Ludecke, 2018). A system may eventually become more economically efficient if performance in science (and hence in chemistry) is maximized while performance gaps between boys and girls are reduced. Students' scientific performance and chances may improve as a result of this approach (Eren-Sisman, 2018). Thus, psychological and social aspects may be linked to the association between cultural elements and students' success in chemistry. The impact of cultural factors on students' chemistry performance persisted even in the absence of a significant cultural background. This study's justification stemmed from the necessity to find out more about the relationship between religion and students' chemistry performance in order to suggest possible remedial actions.

Science and religion are based on different aspects of human experience. In science, explanations must be based on evidence drawn from examining the natural world. Scientifically based observations or experiments that conflict with an explanation eventually

must lead to modification or even abandonment of this explanation. Religious faith, in contrast, does not depend on empirical evidence, not necessarily modified in the face of conflicting evidence, and typically involved supernatural forces or entities. Because they are not part of nature, supernatural entities addressed the aspects of human understanding in different ways. Attempts to put science and religion against each other created controversy where none needed to exist (Oladejo, 2021). Therefore, there is need to explore more on the relationship between religion and students' performance in chemistry with a view of suggesting possible intervention strategies, hence the need for this study.

Statement of the Problem

The national government has made an effort to improve every county's students' academic performance, including Samburu County. The chemistry curriculum was updated, laboratories wre equipped with the required tools, and free day secondary school grants was provided to purchase textbooks at a 1:1 ratio. The administration had attempted to reduce the workload for teachers and students by reviewing and streamlining courses. Even though chemistry performance was falling, the Strengthening of Mathematics and Science in Secondary Education (SMASSE) program gave science teachers on-the-job training to raise subject proficiency levels. Despite efforts to enhance it, the issue of low student performance in chemistry continued. This indicated that further research is required because the true cause of low performance in chemistry has not been found. Because of this disparity, the researcher believed that more thorough research was necessary to determine how religion affect students' performance in chemistry and to provide real improvements.

Study Objective

The study was guided by the following objective:

i. To investigate the relationship between religion and secondary school students' performance in chemistry in Samburu County.

Hypothesis Tested

In order to achieve the objective of the study, the following null hypothesis was tested.

Ho1: There is no statistically significant relationship between religion and secondary school students' performance in chemistry in Samburu County.

Scope of the Study

Students studying chemistry in Form Three were the main focus of the Samburu County study. Its primary focus was investigating the relationship between religion and students' chemistry performance. The students' chemistry performance test (SCPT) was used to evaluate the Mole Concept, Organic Chemistry I, Nitrogen, and its associated compounds as they are taught in the approved Kenya Institute of Curriculum Development syllabus (KICD, 2002). The principles of chemical engineering and industrial chemistry are covered in these Form 3 chemistry courses. They also address subjects that are thought to be difficult and could lead to misconceptions among students. The public secondary schools in Samburu County that are coeducational, boys' and girls' schools hosted the study.

Theoretical Framework

Social constructivist theory was used in an effort to comprehend the connection between religion and secondary school students' chemistry performance. Thus, this hypothesis provided guidance for this investigation. Theoretical formulations related to Vygotsky's Social Constructivist theory (1968) is helpful in examining the connection between a few

chosen cultural elements and chemistry student performance. The theory is a branch of psychology that studies how culture affects behaviour in people. Even while human brain and behaviour share many traits, cultural differences can lead to frequently unanticipated differences in people's attitudes, feelings, and actions.

The fundamental idea of this theory is that knowledge is not a copy of an objective reality, but rather the result of the mind's selection, interpretation, and recreation of events (Kapur, 2018). This suggests that interactions between environmental and subjective factors result in knowledge. For example, individualism and the importance of personal autonomy may be highly valued in some cultures. Collectivism and cooperation among group members, however, could be highly prized in different cultures. Numerous aspects of life could be significantly impacted by these disparities. The study of social constructivism psychology is also growing in significance as researchers attempt to understand the differences and similarities that exist between people from various religious backgrounds worldwide. These days, a lot of psychologists are studying the ways that behaviours differ throughout cultures (Oluwatosin, 2017).

Among the many benefits of the theory are the following: when students explain their ideas to others, they are forced to organize and clarify them; when they interact with other students, they are exposed to a variety of viewpoints; and they are able to spot mistakes and contradictions in their thinking. Inquiries, theories, and conclusions derived from data and experiences are also encouraged of learners. By using distributed cognition, learners arrive at conclusions or solutions together, gain a deeper comprehension of the subject, and ultimately become more creative. Students develop the metacognitive abilities they will need to solve problems on their own in the future. Since psychology evolved in Europe and North America, researchers began to question whether many of the observations and theories that were once thought to be universal would apply to cultures outside of those countries.

The main points of the theory are as follows: people interact with their surroundings to create meaning; people build knowledge through human activity; people in a society collaborate to create reality; learning is an active and social process; and, lastly, meaningful learning occurs when people engage in social activities. The theory also addresses research issues in the relational, causal, descriptive, and consequential domains. Social constructivist theory was used in this study to show how the Samburu community has enhanced their quality of life over time by sustainably employing cultural resources in their community. A suitable theoretical approach served as the foundation for this investigation of the potential contributions of ideas, customs, traditions, religion, and other cultural factors to a group's process of cultural adaptation.

By taking into account the holistic concept approach, which emphasizes that many significant cultural factors, such as kinship structures, land tenure, land use, parental and teacher influence, learning environments, resources and religion among many others, should not be considered in isolation from their interrelationships. The interpretation of data findings avoids the inherent weakness of this theory (Oladejo, 2021). Therefore, the Social Constructivist theoretical approach provided guidance on how religion relate to Samburu County, Kenya, students' performance in chemistry.

Nonetheless, the literature assessment revealed the following gaps: First, several of the research that were previously mentioned in relation to the current study were carried out of context. The researcher also found that, as far as he was aware, no empirical research had been done to examine the aforementioned variables and how they related to the chemistry

performance of Samburu County students. Thus, in order to close these gaps, the researcher planned to gather enough information about the religious beliefs that influence Samburu County students' performance in chemistry.

Conceptual Framework

The conceptual framework used in this study was based on the Social Constructivist Theory presented by Vygotsky (1968). To successfully adapt Vygotsky's Social Constructivist Theory, the conceptual model representation illustrated in Figure 1, was used to guide the study.

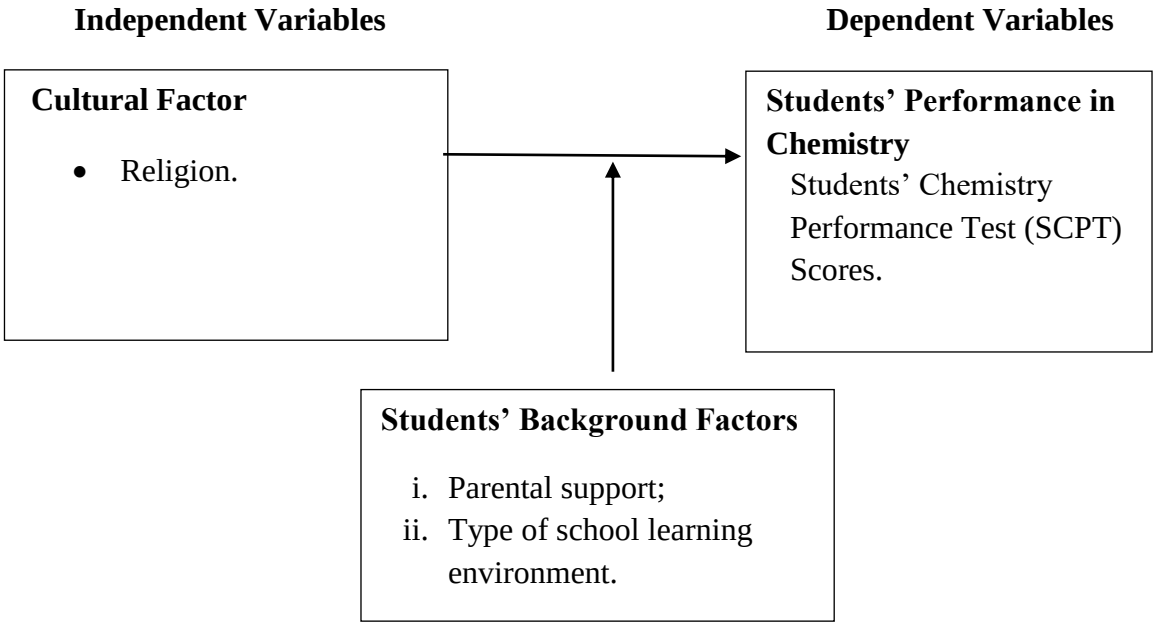

Figure 1: *Conceptual Framework for investigating the Relationship between Religion and Students' Performance in Chemistry*

Figure 1 illustrates the conceptual framework that was used to guide the study. It has three main interrelated variables namely; independent, dependent and intervening variables. The independent variables are the cause and their values are independent of other variables in the study. The dependent variables are the effect and their values depend on changes in the independent variables. Lastly the intervening variables are variables that link both the independent and the dependent variables, allowing the relationship between them to be better explained. The intervening variables in this study were support from parents and the type of school learnin+g environment. These were controlled as follows: - Support from parents was controlled by involving Form Three students who did not miss classes because of indiscipline cases, being out of school due to lack of school fees or even text books and other instructional materials for use in school. Type of school learning environment was controlled by involving both public and private, single sex and co-educational secondary schools which had Form Three students, trained

Chemistry teachers and fully equipped science laboratories. This would help students to develop scientific skills and better understanding of chemistry concepts. In this study, religion was the independent variable while students' performance in chemistry was the dependent variable. Enhanced students' performance in chemistry was the expected outcomes and finally students' background factors in this study were the intervening variables.

However, the following gaps were identified from the literature review: First a number of studies discussed in the literature review were conducted out of context in relation to the study at hand. The study also established that there was no empirical research known to have been undertaken to study the relationship between religion and students' performance in chemistry with particular reference to Samburu County. Therefore, to fill in the gap above, in this study sufficient data on religious beliefs that had a bearing on students' performance in chemistry in Samburu County was collected.

MATERIALS AND METHODS

The study was a Correlational research, where Descriptive Correlational survey design was used. The design involved the measurement of two variables and correlating them to establish the magnitude and direction of relationship that might exist (Leedy, 2010). The importance of correlation research has been emphasized by Kuhn (2014) and Carvallo (2005). The design was relevant in this study because it would provide a way of establishing relationships between religion and students' performance in chemistry. The study, therefore, would give an analysis of the relationships between the variables, hence the relevance of the design being chosen because of the nature of the subject of inquiry in this study.

Sample Size and Sampling Procedures

The sampling units were the secondary schools. Cluster sampling technique was used to select nine secondary schools with adequate teaching/learning resources. The schools were visited to ensure that they were suitable for the study. Class lists were used as sampling frames and only students of the Samburu ethnic community were selected for the study. Stratified and simple random sampling was used in selecting boys and girls in single sex and co-educational schools because it gave each unit in the population an equal opportunity to be involved in the sample (Kathuri & Pals, 1993). Nkapa (1997) argues that, there is no first hand rule for determining a sample size. However, in this study the expression,

$$n = \frac{Z^2 PqN}{(N-1)e^2 + Z^2 Pq} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

was used in determining a sample size (n) as with Kothari (2004) method of sample size determination from a finite population as shown in appendix (V) where: -

n = Required Sample Size,

Z = Value of Standard Variate =1.96 @ 95% Coefficient Interval (Cl),

N = The given Population Size (N = 1,238),

e = Acceptable Error and Degree of Accuracy (e = 0.05),

P = Proportionate Target Population with Particular Characteristics (P = 0.141),

q = 1- P = 0.859.

Using this formula, a sample size of 286 was proportionately selected which included 114 girls and 172 boys from nine secondary schools. Therefore, the minimum number of girls that were selected per school was 19, while on the other hand the minimum number of boys was 29. The total sample size selected is shown in Table 2.

Table 2: Selection of the Sample Size per School Type and Gender

School Type	Total No. of Schools	Total No. of Girls	Total No. of Boys	Total
Girls' schools	3	84	-	84
Boys' schools	3	-	109	109
Co-educational	3	30	63	93
Total	**9**	**114**	**172**	**286**

From the total sample of 286 in Table 2, 114 were girls and 172 were boys. This translated to 40 (%) percent and 60 (%) percent respectively. Cluster sampling was used to ensure that each category of schools was equitably selected for the study. Using cluster sampling technique, schools in each of the sub-Counties in Samburu County were grouped into a cluster, such that schools in every sub-County formed a separate cluster for easy studying. Because of the homogeneity of the schools across the sub-Counties in the County, small size sub-Counties with one or two secondary schools were merged with large sub-Counties with many schools falling on the same side of the County, hence having two major sub-Counties which were Samburu North and Samburu Central. For the purpose of sampling, distribution of schools in each of the two major sub-Counties was based on the type of school category as shown in Table 3.

Table 3: Selection of School Category for Sample Size

School Type	Samburu North	Samburu Central	Total
Boys	1	2	3
Girls	2	1	3
Co-education	1	2	3
Total	**4**	**5**	**9**

The advantage of cluster sampling was that, it ensured the inclusion into the sample sub-groups which otherwise would be omitted entirely by other sampling methods because of their low number in population (Mugenda & Mugenda, 1999). To ensure that all parts of the County would be represented, equal number of schools from each school type was selected randomly from each of the two major sub-Counties since most of the schools in Samburu County had one stream.

Data Collection and Analysis

To facilitate access into the school, a research permit was sought from the state agency that authorizes research in the Country, the National Commission for Science, Technology and Innovation (NACOSTI). The research instruments, the SCPT and SRQ were self-administered, where the respondents were given a humble time to respond to the items in both instruments on two different occations in each school.

The SCPT and SRQ were scored so as to generate the quantitative data. Quantitative data generated by SCPT and SRQ was analyzed using Simple Linear Regression and with the use of Statistical Package for Social Sciences (SPSS) version 23.0 for windows (Kothari, 2004). Data analysis involved use of hypothesis as a guide for analyzing data. To make reliable inferences from the data, all tests of significance were performed at a significance of Coefficient level of alpha (α) equal to 0.05.

FINDINGS

Results of Students' Chemistry Performance Test (SCPT)

Students' Chemistry Performance Test (SCPT) was administered on the all 286 students who sat for the test. Data was collected, analyzed and presented in a tabular form using figures and the results are summarized in Table 4.

Table 4: Students' Chemistry Performance per Sub- County (N= 286)

Sub- County	No. of Respondents	Mean (%)
Samburu North	116	28.90
Samburu Central	170	19.53
Total	286	23.64

Results in Table 4 show that Samburu North Sub-County was on the lead with a mean of 28.90% while Samburu Central was second with a mean of 19.53% and this could be attributed to having few and adequately equipped schools in Samburu North Sub-County compared to Samburu Central. In the sampled schools, both boys and girls were involved in the study. The results of the Students' Chemistry Performance Test (SCPT) scores by gender of students are presented in Table 5.

Table 5: Students' Chemistry Performance Test (SCPT) Scores Scored by the different Gender of Students (N= 286)

Gender	No. of Respondents	Mean (%)
Female	112	17.12
Male	174	26.80
Total	**286**	**23.64**

Results in Table 5 indicate that male students performed better than the female students as indicated by their respective means. This could be attributed to the general notion that sciences were for males and not for females. Results of different school categories on students' performance in chemistry are summarized in Table 6.

Table 6: Different School Categories on Students' Performance in Chemistry (N= 9)

School Category	Total No. of Schools	Mean (%)
Boys' Schools	3	44
Girls' Schools	3	24
Co-Educational Schools	3	32
Total	**9**	**100**

Results in Table 6 show that Boys' Schools were on the lead with a mean of 44% while Co-Educational Schools emerging second with a mean of 32% and lastly in the third position were the Girls' Schools with a mean of 24%.

Relationship between Religion and Students' Performance in Chemistry

Students' Chemistry Performance Test (SCPT) scores of students and total mean scores of students' responses obtained from the SRQ questionnaires were used in computing the relationship between religion and students' performance in chemistry. The statistical test used was Simple Linear Regression. The data obtained on religious beliefs was further categorized according to students' religious affiliations for example Christian, Muslim and African

Tradition Religion (ATR). The results for students' religious beliefs mean scores are provided in Table 7.

Table 7: Students' Religious Beliefs Mean Scores (N = 286)

Questions	Religious Beliefs Mean Scores
1. My religion does not prevent my performance in chemistry.	3.19
2. Religious beliefs have connection with students' performance in chemistry.	2.64
3.Non-religious beliefs have no connection with students' performance in chemistry.	2.67
4. Religious worship affect students' performance in chemistry.	2.09
5. Non- religious worship do not affect students' performance in chemistry.	2.72
6. Religion forms the basic foundation for students' performance in chemistry.	2.80
7. Performance in chemistry is not connected to students' religion.	2.71
8. Good achievers in chemistry do not perform well in religious studies.	1.86
9. Religion is a key tool for better performance in chemistry.	2.59
10. Exam questions in chemistry are easier than religious questions.	2.24
11. Religion promote students' performance in chemistry.	2.66
12. Religion does not promote students' performance in chemistry.	2.41

Table 7 shows the mean scores per question according to students' responses on the SRQ questionnaire. Students' responses on the SRQ questionnaire were rated according to their level of agreement in the level of assigning weights from 1 to 5 for each position on the rating scale. Statistical Package for Social Sciences (SPSS) version 23 for windows was used to compute mean scores on students' responses for each question in the SRQ questionnaire. From the religious beliefs mean scores, question one with a mean score of 3.19 was the most popular question to students while question eight with a mean score of 1.86 was the unpopular question to students. These results clearly indicate that students have challenges in relating religious beliefs to scientific concepts in chemistry. Results on model summary for the relationship between religious beliefs and students' performance in chemistry are provided in Table 8.

Table 8: Model Summary for the Relationship between Religion and Students' Performance in Chemistry (N= 286)

Model	R	R^2	Adj. R^2	Std. Error Estimate	Change Statistics				
					R^2 Change	F Change	df 1	Change Statistics	
1	0.185[a]	0.034	0 .031	13.91646	0.034	10.017	1	df 2 284	Sig. F. Change 0.002

a. Predictors: (Constant), Religious Beliefs.

The adjusted R^2 – Value of 0.031 indicates that 3.1% change in students' performance in chemistry is explained by religious beliefs with a P- Value of 0.002. This meant that, there was a linear relationship between the variables in the study. Results on the coefficients for the relationship between religion and students' performance in chemistry are provided in Table 9.

Table 9: Coefficients for the Relationship between Religion and Students' Performance in Chemistry (N= 286)

Model	Unstandardized Coefficients		Standardized Coefficients		
	ß(Beta)	Std. Error.	Beta	T	Sig.
1 (constant)	36.828	4.246		8.673	0.000
Religious Beliefs.	-4.629	1.463	-0.185	-3.165	0.002

The Correlation is not Significant at 0.05 level (2- Tailed).

a. Dependent Variable: Chemistry Performance.

r- Value = 0.031, P = 0.002, P < 0.05.

Equation for the Model

Y = 36.828 – 4.629X.

Y = Students' Performance in Chemistry.

X = Students' Religious Beliefs.

Table 9 shows the coefficients results for the relationship between religion and students' performance in chemistry of hypothesis one of the study. Hypothesis one of the study sought to find out the relationship between religion and students' performance in chemistry. Results in the coefficient Table 9 revealed that for every unit change in the religious beliefs, there was a drop of – 4.629 in students' performance in chemistry. However, the change was not statistically significant at alpha (α) equal to 0.05 (r = 0.031, N = 286, p < 0.05). This was attributed to students' negative attitude towards sciences and not being in a position to clearly understand the relationship between religion and their performance in sciences especially in chemistry. Since p-value of 0.002 was less than the level of significance at alpha (α) equal to 0.05, meant that, there is no sufficient evidence for accepting the claim. Therefore, there is a linear relationship between the variables, the data is not consistent with the null hypothesis and results are statistically significant. There is also an indication that an effect existed between the variables. Therefore, the null hypothesis was rejected. The results for Christian students' religious beliefs mean scores obtained using SRQ questionnaires are provided in Table 10.

Table 10: Christian Students' Religious Beliefs Mean Scores (N = 275)

Questions	Religious Beliefs Mean Scores
1. My religion does not prevent my performance in chemistry.	3.19
2. Religious beliefs have connection with students' performance in chemistry.	2.64
3.Non-religious beliefs have no connection with students' performance in chemistry.	2.67
4. Religious worship affect students' performance in chemistry.	2.09
5. Non- religious worship do not affect students' performance in chemistry.	2.70
6. Religion forms the basic foundation for students' performance in chemistry.	2.77
7. Performance in chemistry is not connected to students' religion.	2.69
8. Good performers in chemistry do not perform well in religious studies.	1.85
9. Religion is a key tool for better performance in chemistry.	2.55
10. Exam questions in chemistry are easier than religious questions.	2.24
11. Religion promote students' performance in chemistry.	2.62
12. Religion does not promote students' performance in chemistry.	2.40

Table 10 shows the mean scores per question according to Christian students' responses on the SRQ questionnaire. Students' responses on the SRQ questionnaire were rated according to their level of agreement in the level of assigning weights from 1 to 5 for each position on the rating scale. Statistical Package for Social Sciences (SPSS) version 23 for windows was used to compute mean scores on students' responses for each question in the SRQ questionnaire. From the religious beliefs mean scores, question one with a mean of 3.19 was the most popular question to students while question eight with a mean score of 1.85 was the unpopular question to students. From these results it is clear that religious beliefs have an effect on students' performance in chemistry. Results on model summary for the relationship between religion and Christian students' performance in chemistry are provided in Table 11.

Table 11: Model Summary for the Relationship between Religion and Christian Students' Performance in Chemistry (N= 275)

Model	R	R^2	Adj. R^2	Std. Error Estimate	Change Statistics				
					R^2 Change	F Change	df 1	Change Statistics	
1	0.186[a]	0.035	0 .031	13.77341	0.035	9.766	1	df 2 273	Sig. F. Change 0.002

a. Predictors: (Constant), Religious Beliefs.

The adjusted R^2 – Value of 0.031 indicates that 3.1% change in students' performance in chemistry is explained by religious beliefs with a P- Value of 0.002. This meant that, there was a linear relationship between the variables in the study. Results on the coefficients for the relationship between religion and Christian students' performance in chemistry are provided in Table 12.

Table 12: Coefficients for the Relationship between Religion and Christian Students' Performance in Chemistry (N= 275)

Model	Unstandardized Coefficients		Standardized Coefficients		
	ß(Beta)	Std. Error.	Beta	T	Sig.
1 (constant)	36.724	4.340		8.461	0.000
Religious Beliefs.	-4.674	1.496	-0.186	-3.125	0.002

The Correlation is not Significant at 0.05 level (2- Tailed).

a. Dependent Variable: Chemistry Performance.

r- Value = 0.031, P = 0.002, P < 0.05.

Equation for the Model

Y = 36.724 – 4.674X.

Y = Students' Performance in Chemistry.

X = Students' Religious Beliefs.

Table 12 shows the coefficients results for the relationship between religion and Christian students' performance in chemistry of hypothesis one of the study. Hypothesis one of the study sought to find out the relationship between religion and students' performance in chemistry. Results in the coefficient Table 12 revealed that for every unit change in the religious beliefs, there was a drop of – 4.674 in students' performance in chemistry. However, the change was not statistically significant at alpha (α) equal to 0.05 ($r = 0.031$, $N = 275$, $p < 0.05$). This was attributed to students' negative attitude towards sciences and not being in a position to clearly understand the relationship between religion and their performance in sciences especially in chemistry. Since p-value of 0.002 was less than the level of significance at alpha (α) equal to 0.05, meant that, there is no sufficient evidence for accepting the claim. Therefore, there is a linear relationship between the variables, the data is not consistent with the null hypothesis and results are statistically significant. There is also an indication that an effect existed between the variables. Therefore, the null hypothesis was rejected. The results for Muslim students' religious beliefs mean scores are summarized in Table 13.

Table 13: Muslim Students' Religious Beliefs Mean Scores (N = 8)

Questions	Religious Beliefs Mean Scores
1. My religion does not prevent my performance in chemistry.	3.50
2. Religious beliefs have connection with students' performance in chemistry.	2.75
3.Non-religious beliefs have no connection with students' performance in chemistry.	2.50
4. Religious worship affect students' performance in chemistry.	1.50
5. Non- religious worship do not affect students' performance in chemistry.	3.25
6. Religion forms the basic foundation for students' performance in chemistry.	3.63
7. Performance in chemistry is not connected to students' religion.	3.00
8. Good performers in chemistry do not perform well in religious studies.	1.75
9. Religion is a key tool for better performance in chemistry.	4.25
10. Exam questions in chemistry are easier than religious questions.	2.88
11. Religion promote students' performance in chemistry.	3.75
12. Religion does not promote students' performance in chemistry.	2.50

Table 13 shows the mean scores per question according to Muslim students' responses on the SRQ questionnaire. Students' responses on the SRQ questionnaire were rated according to their level of agreement in the level of assigning weights from 1 to 5 for each position on the rating scale. Statistical Package for Social Sciences (SPSS) version 23 for windows was used to compute mean scores on students' responses for each question in the SRQ questionnaire. From the religious beliefs mean scores, question nine with a mean score of 4.25 was the most popular question to students while question four with a mean score of 1.50 was the unpopular question to students. These results show that religion has a profound effect on students' performance in chemistry. Results on model summary for the relationship between religion and Muslim students' performance in chemistry are provided in Table 14.

Table 14: Model Summary for the Relationship between Religion and Muslim Students' Performance in Chemistry (N= 8)

Model	R	R^2	Adj. R^2	Std. Error Estimate	Change Statistics				
					R^2 Change	F Change	df 1	Change Statistics	
1	0.210[a]	0.039	0 .031	0.29196	0.039	0.210	1	df 2 6	Sig. F. Change 0.002

a. Predictors: (Constant), Religious Beliefs.

The adjusted R^2 – Value of 0.031 indicates that 3.1% change in students' performance in chemistry is explained by religious beliefs with a P- Value of 0.002. This meant that, there was a linear relationship between the variables in the study. Results on the coefficients for the relationship between religion and Muslim students' performance in chemistry are summarized in Table 15.

Table 15: Coefficients for the Relationship between Religion and Muslim Students' Performance in Chemistry (N= 8)

Model	Unstandardized Coefficients		Standardized Coefficients		
	ß(Beta)	Std. Error.	Beta	T	Sig.
1 (constant)	1.068	0.123		0.243	0.000
Religious Beliefs.	-0.134	0.042	-0.188	-2.273	0.002

The Correlation is not Significant at 0.05 level (2- Tailed).

a. Dependent Variable: Chemistry Performance.

r- Value = 0.031, P = 0.002, P < 0.05.

Equation for the Model

Y = 1.068 – 0.134X.

Y = Students' Performance in Chemistry.

X = Students' Religious Beliefs.

Table 15 shows the coefficients results between religion and Muslim students' performance in chemistry of hypothesis one of the study. Hypothesis one of the study sought to find out the relationship between religion and students' performance in chemistry. Results in the coefficients Table 15 revealed that for every unit change in the religious beliefs, there was a drop of – 0.134 in students' performance in chemistry. However, the change was not statistically significant at alpha (α) equal to 0.05 (r = 0.031, N = 8, p < 0.05). This was attributed to religious believes lacking practical skills required by students in learning of sciences and hence not helping them in the understanding of scientific concepts especially in chemistry. Since p-value of 0.002 was less than the level of significance at alpha (α) equal to 0.05, means that, there is no sufficient evidence for accepting the claim. Therefore, there is a linear relationship between the variables, the data is not consistent with the null hypothesis and results are statistically significant. There is also an indication that an effect existed between the variables. Therefore, the null hypothesis was rejected. The results for ATR students' religious beliefs mean scores obtained using SRQ questionnaire are provided in Table 16.

Table 16: ATR Students' Religious Beliefs Mean Scores (N = 3)

Questions	Religious Beliefs Mean Scores
1. My religion does not prevent my performance in chemistry.	2.33
2. Religious beliefs have connection with students' performance in chemistry.	2.33
3.Non-religious beliefs have no connection with students' performance in chemistry.	4.00
4. Religious worship affect students' performance in chemistry.	3.67
5. Non- religious worship do not affect students' performance in chemistry.	3.33
6. Religion forms the basic foundation for students' performance in chemistry.	3.33
7. Performance in chemistry is not connected to students' religion.	4.33
8. Good performers in chemistry do not perform well in religious studies.	3.00
9. Religion is a key tool for better performance in chemistry.	2.67
10. Exam questions in chemistry are easier than religious questions.	1.33
11. Religion promote students' performance in chemistry.	3.00
12. Religion does not promote students' performance in chemistry.	2.33

Table 16 shows the mean scores per question according to ATR students' responses on the SRQ questionnaire. Students' responses on the SRQ questionnaire were rated according to their level of agreement in the level of assigning weights from 1 to 5 for each position on the rating scale. Statistical Package for Social Sciences (SPSS) version 23 for windows was used to compute mean scores on students' responses for each question in the SRQ questionnaire. From the religious beliefs mean scores, question seven with a mean score of 4.33 was the most popular question to students while question ten with a mean score of 1.33 was the unpopular question to students. These results indicate that religious beliefs had no effect on students' performance in chemistry.

Results on model summary for the relationship between religion and ATR students' performance in chemistry are summarized in Table 17.

Table 17: Model Summary for the Relationship between Religion and ATR Students' Performance in Chemistry (N= 3)

Model	R	R^2	Adj. R^2	Std. Error Estimate	Change Statistics				
					R^2 Change	F Change	df 1	Change Statistics	
1	0.211[a]	0.039	0.031	0.04866	0.039	0.035	1	df 2 1	Sig. F. Change 0.002

a. Predictors: (Constant), Religious Beliefs.

The adjusted R^2 – Value of 0.031 indicates that 3.1% change in students' performance in chemistry is explained by religious beliefs with a P- Value of 0.002. This meant that, there was sufficient evidence to conclude that there was a linear relationship between the variables. Results on the coefficients for the relationship between religion and ATR students' performance in chemistry are provided in Table 18.

Table 18: Coefficients for the Relationship between Religion and ATR Students' Performance in Chemistry (N= 3)

Model	Unstandardized Coefficients		Standardized Coefficients		
	ß(Beta)	Std. Error.	Beta	T	Sig.
1 (constant)	0.401	0.046		0.091	0.000
Religious Beliefs.	-0.050	0.016	-0.191	-0.852	0.002

The Correlation is not Significant at 0.05 level (2- Tailed).

a. Dependent Variable: Chemistry Performance.

r- Value = 0.031, P = 0.002, P < 0.05.

Equation for the Model

Y = 0.401 – 0.050X.

Y = Students' Performance in Chemistry.

X = Students' Religious Beliefs.

Table 18 shows the coefficients results for the relationship between religion and ATR students' performance in chemistry of hypothesis one of the study. Hypothesis one of the study sought to find out the relationship between religion and students' performance in chemistry. Results in the coefficients Table 18 revealed that for every unit change in the religious beliefs, there was a drop of – 0.050 in students' performance in chemistry. However, the change was not statistically significant at alpha (α) equal to 0.05 ($r = 0.031$, $N = 3$, $p < 0.05$). This was attributed to religious believes lacking practical skills required by students in learning of sciences and hence not forming the basic foundation in the understanding of scientific concepts. Since p-value of 0.002 was less than the level of significance at alpha (α) equal to 0.05, means that, there is no sufficient evidence for accepting the claim. Therefore, there is a linear relationship between the variables, the data is not consistent with the null hypothesis and results are statistically significant. There is also an indication that an effect existed between the variables. Therefore, the null hypothesis was rejected.

Discussion

Results of Students' Chemistry Performance Test (SCPT)

The results obtained reveal that, boy's schools performed better than girls and co-educational schools. From the results, boy's schools had a percentage of 44%, girl's schools with 24% and co-educational schools with 32%. The mean percentage for all boys sampled was 26.80%, and that of girls was 17.12%. The overall mean percentage for the whole sample was 23.64%. The general performance was below average as shown in Table 5. The findings of this study were consistent with those of Sifuna and Kaime (2007) which indicated that, many students in Kenya choose to drop science subjects when given a choice and even for those who take them, the performance was below average. At this point then, it was important to point out that students' background was a broad concept which comprised of very many factors and varied from community to community. This was for example perception towards education varied depending on the community. Poverty lowered the parent's ability to pay fees and purchase of learning materials for their children (Ongeri, 2012). Cultural factors were also another community based factors which condemned women to be married off at an early age before completing their education. Religious beliefs systems affected students' attendance,

motivation, attitude towards sciences and mostly profound in gender contexts. Those factors contributed to poor performance in academics and also led to school dropout particularly at secondary school level (Irungu, 2019).

Relationship between Religion and Students' Performance in Chemistry

The factors between students' chemistry performance and religion had a significant positive linear association at alpha (α) equal to 0.05 ($r = 0.031$, $N = 286$, $P < 0.05$), according to the data. The reasons given for this were; students' lack of enthusiasm in the sciences, their religious convictions' deficiency in useful concepts for science education, and their incapacity to see the link between religion and academic success in the sciences especially chemistry. As a result, the null hypothesis was shown to be false. Three categories were formed based on the data of the relationship between students' religious affiliations and their performance in chemistry: African Tradition Religion (ATR), Muslims, and Christians.

i. Religion and Christian Students' Performance in Chemistry

A substantial positive linear linkage at alpha (α) equal to 0.05 was discovered to exist between the religion and chemical skills of Christian students ($r = 0.031$, $N = 275$, $P < 0.05$). This was attributed to the students' contempt for the sciences and their failure to understand the relationship between religion and academic success, especially in the area of chemistry. As a result, the null hypothesis was shown to be false and rejected.

ii. Religion and Muslim Students' Performance in Chemistry

According to the results, there was a positive connection at alpha ($\alpha = 0.05$) ($r = 0.031$, $N = 8$, $P < 0.05$) between the chemistry proficiency of Muslim students and their faith. This suggested that there was a linear relationship between the chemistry and religion scores of the learners. This was related to the fact that religious beliefs did not offer the more hands-on activities that are ideal for the study of sciences, making them an inadequate basis for the explanation of specific scientific concepts in chemistry. As a result, the null hypothesis was rejected.

iii. Religion and ATR Students' Performance in Chemistry

The results demonstrated a positive correlation between religion and ATR students' chemistry performance, at alpha (α) equal to 0.05 ($r = 0.031$, $N = 3$, $P < 0.05$). This suggested that there was a linear relationship between the chemistry and religion scores of the learners. This was clarified by the claim that religion did not contribute to the advancement of scientific knowledge because it lacked the pragmatic ideas required to comprehend the sciences. As a result, the null hypothesis was rejected.

The findings of this study concurred with Chan's (2020), who observation that everyone is the beneficiary of God's free gifts. Thus, in a passive way, God's glory fell upon those who received it in their lives. The outcomes also agreed with Ruschenpohler (2019) findings, which indicated that a person's religious beliefs greatly and significantly influence the decisions they make in life. Harris (2021) recognized that the integration of faith-based learning was seen as the duty of educators and educational institutions, who saw teachers as active Christian skill providers and students as passive learners. This was in reference to the teaching approach used by lecturers or professors.

In a similar vein, Richard (2018) proposed a tentative approach to connect academic competencies with Christian principles. The approach discouraged indoctrination while promoting students' logical independence and critical thinking. Three educational processes

were included in the initial model that was proposed: Three main areas were recognized by the students: 1) conflict: they recognized the difficulties separating Christian faith from scientific ideas; 2) creativity: they disproved stereotypes and made faith and abilities seem hard; and 3) commitment: they combined social beliefs with their own creative solutions to overcome obstacles.

When connecting the discipline's topic knowledge with Christian beliefs, the two methods previously discussed were designed to address the issues faced by both the teacher who serves as the knowledge provider and the students, who are less engaged learners. According to Oladejo (2021), being a lover rather than a thinker is what makes a human being fundamentally unique. This comprehension of the fundamental nature of humanity proposed that education be viewed as a formation in which the aspirations and hearts of both teachers and students were directed toward the contours of human development. Aiming to recruit not only the head but also the intellect, heart, and every other element of the human body, the entire process required the faculty to develop teaching and learning techniques that were faithfully consistent with the shape of Christian activities.

The study's findings from the three student groups according to their religious affiliations disagreed with those of Eskola (2020), who contended that Jewish persecution may have compelled the wisdom teachers to embrace a new eschatological dualism that maintained that faith was ultimately determined by abiding by the law and covenantal selection. Therefore, although predestination was crucial to comprehending science, it was not fate.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on the findings of this study, the following conclusion was made:

i. The correlation results between religion and students' performance in chemistry were statistically significant. This meant that, religion had a significant linear relationship with students' performance in chemistry.
ii. Some of the limitations of the study were small number of ATR and Muslim students in schools, reliance on correlation results and luck of adequate qualitative data.

Recommendations

On the basis of the results of this study, the following recommendations were made:

i. The Ministry of Education should initiate in-service courses for science teachers to equip themselves with the skills and knowledge of the relationship between religion and students' performance in chemistry so as to enhance their effectiveness in teaching of science subjects.
ii. Learning of Chemistry and other science subjects in secondary school curriculum should be practical oriented and student centered. This could help students interpret their religious beliefs in scientific phenomena to modern science hence enhancing their understanding of chemistry and other sciences.

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