

## **Social Learning Environment And Problem-Solving Techniques On Students' Performance In Senior Secondary School Science: Do Gender Moderate The Correlation?**

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**Abstract** \_ The report summarizes findings of social learning environment and problem-solving techniques correlation on senior secondary school science students (n=1111) performance at Onitsha education zones of Anambra state, Nigeria. The Yamane sample size approach was used to draw the sample. The study was guided by five objectives, five research questions, and five hypotheses. The Social Learning Environment Questionnaire (SLEQ), the Problem Solving Technique Inventory (PSTI), and the Students' Academic Performance Test (SAPT) were the three instruments used for data collection in the study. The results indicated among others a low negative correlation between students' opinions of social learning and their academic performance (Pearson  $r = -0.03$ ) and a low negative correlation between male and female students' perception of social learning and academic performance senior secondary school science subjects (Pearson  $r = -0.02$ ). The technique of male and female students to solve issues was found to have a low positive

correlation with performance results in senior secondary school scientific subject (Pearson  $r = -0.08$ ), the influence in gender is not statistically significant ( $p > 0.05$ ).

**Keywords:** Science, Agricultural Science, Animal Husbandry, Biology, Chemistry, Data Processing, Fisheries, Foods & Nutrition, Mathematics, Physics, Social Learning Environment and Problem- Solving Skills.

## I. INTRODUCTION

Science is perceived as a corpus of knowledge as well as an approach to inquiry and reasoning in the pursuit of an understanding of nature. Through science education, science has a significant impact on a nation's progress and its residents' lives [9]. Science is a subject that can be taken at upper basic or junior secondary school, as well as senior secondary school. Science instruction in senior secondary schools was the study's main topic. Mathematics, Physics, Agriculture Science, Animal Husbandry, Biology, Chemistry, Data Processing, Fisheries, and Foods & Nutrition are a few of the science subjects offered at senior secondary schools. All of them are referred to as senior secondary school scientific subjects as averred by [18] [22].

The production and processing of food and fiber are the main topics of agricultural science, as a scientific course/science subject taken in senior secondary school. These include soil farming, growing and harvesting crops, rearing livestock, and preparing plant and animal products for consumption by humans. On the other hand, animals raised for meat, fiber, milk, or other products are the subject of "animal husbandry," a branch of agriculture that is studied in science classes in senior secondary schools. The morphology, physiology, anatomy, behavior, origin, and distribution of living organisms are all covered in biology as a senior secondary science subject. It is divided up into other specialized subcategories. More so science study of nature, matter's composition and qualities, and the changes that matter goes through under various circumstances is known as Chemistry [19]. More precisely, Chemistry is the study of our environment and the events that surround it. In senior secondary school, the scientific subject of data processing looks at the collection and handling of raw data to produce useful information. Fisheries is the academic topic that deals with managing and understanding fisheries; it is also taught as a scientific subject in senior secondary schools. In an effort to provide students an integrated education, the multidisciplinary secondary school science of fisheries combines ideas from several other disciplines, including limnology and oceanography. Consequently, senior secondary school students studying both science and the arts are expected to take mathematics, which can be thought of as the abstract science of number, amount, and space. The science topic of physics in senior secondary education focuses on the properties and nature of matter and energy. Physics is the study of mechanics, electricity, magnetism, sound, heat, light, and other radiation, as well as atom structure. All of these and many more are referred to as science subjects in senior secondary schools [3] [9] [13].

In more of advantages, science subjects in senior secondary schools provide humans with a wealth of relevant and valuable knowledge in addition to explaining the environment. Examples include the industrial production of food and drink, textiles, fertilizer, insecticides, clothes, and many other practical concepts and applications. Most of these senior secondary school science subjects have also added to the body of knowledge regarding the theoretical basis for ammunition production for usage in a variety of industries, including construction, defense, security, and medicine [13].

There remain concerns about the performance of these secondary school students in certain science subjects, despite the fact that science is essential to humans and their environment. Research over the years has demonstrated that students who enroll in most of these science subjects in secondary school perform poorly academically [8] [16]. Students' performance in various senior secondary school science subjects has taken on a considerable character, according to the Chief Examiner's report from the West African Examinations Council (WAEC) on the majority of secondary school science subjects from 2015 to 2019.

The Chief Examiner in agricultural science summarized that students have difficulty answering questions about bush clearance, stumping, plowing, harrowing, ridging, nursery, and transplanting management. Similarly, students find it difficult to answer questions in Animal Husbandry that deal with pasture and range management as well as livestock management systems. The areas where the students' deficiencies in data processing were most noticeable were in the areas of application and system software.

Additionally, the West African Examination Council (WAEC) Chief Examiners' reports from 2015 to 2019 detailed a number of explanations for why students' biology grades fell short of grade level. A few of the justifications provided were: (i) unable to explain why a Rhesus negative man shouldn't marry a Rhesus positive woman in order to prevent her from losing her second pregnancy; (ii) inadequate knowledge of genetics; and (iii) pictures not being given titles. (iv) inadequate schematics (v) inability to cross breeding in the genetics properly (vi) poor performance in questions that require application knowledge (vii) inability to identify parts of skeleton. In tandem with this, the WAEC Chief Examiners reports covering physics, mathematics, and chemistry for each of the three topics from 2015 to 2019 are provided here.

The reports state that among other things, Chemistry candidates' deficiencies included their inability to understand the requirements of the questions, their poor communication skills, the fact that they wrote insignificant names rather than formulas, and their application of theoretical knowledge to real-world issues. On the other hand, it was more apparent in Algebra how poorly the Mathematics students performed. In Physics, students struggle most in courses that deal with waves and electricity, according to the particular WAEC evaluation. All of these suggest that students in senior secondary school approach in most of these science classes lack problem-solving techniques that are required. It is also possible that the social learning environment where these

students experienced have their learning in schools played may be playing a role in their inability to solve most scientific problems [15].

## II. LITERATURE REVIEW

In this section the authors reviewed the existing literatures on the social learning environment and problem-solving techniques on students' performance.

A social learning environment (SLE) is a setting where people come together to work together to create content, share information, and learn from one another. In order to create a safe space for group projects and learning, [7] defines a social learning environment as one that incorporates social learning elements including networking, tagging, file sharing, and microblogging. [22] define the social learning environment as a combination of technology and learning resources, instructional strategies, learning modalities, and connections to local, national, and global contexts through the use of problem-solving techniques [7].

Problem solving techniques (PST) are the ability to identify a problem, identify its underlying cause, and consider all possible solutions. According to [10], PST is the ability to employ pertinent strategies to deal with unforeseen difficulties in a systematic manner. Additionally, PST has been shown to be essential to success in organizational and personal contexts relating to science-related efforts, according to [10].

PST are unpredictable and require a systematic approach, claims [8]. Problem-solving techniques are characterized by several studies conducted in the field of technology-based teaching and learning, according to [11]. PST is the systematic application of general or ad hoc strategies to problem solving [14]. Students' attitudes about materials that exhibit a high degree of performance in science disciplines will be positively impacted by these strategies once they have mastered them. The degree to which a student, instructor, or institution has met their immediate or long-term learning objectives is known as their academic performance [6]. Students' level of learning ownership is reflected in their academic performance. Numerous factors, such as student truancy, a poor social learning environment, inept teachers, inadequate teaching methods, and others, have an impact on students' academic performance in science classes in senior secondary school. These factors bear so much influence on the academic performance of senior secondary school science students that over the years, science students at that level do not show much interest in science subjects, they see science subjects as unattainable task, with that most of them having obnoxious notion about sciences and science subject in general due to senior secondary school students social learning environment [6].

Certain academics have also looked at the issue of the ad hoc relationship between social learning environments, students' technique to solve problems, and their academic achievement in scientific classes at the senior secondary school level. The performance of senior secondary school students and the classroom environment, with a low mean perception and low negative impression, actually did not differ in any noticeable or significant ways, according to [5]. Furthermore, [2]

discovered that, especially for male and female students, a well-equipped and supportive learning environment with qualified professors had a significant impact on senior mechanical students' academic performance. The students equally perceive their technique to solve problems, therefore there is no noticeable difference in the judgments of the gender groups.

[20] discovered a statistically significant difference in the relationship between senior secondary school students' performance and their problem-solving techniques in the majority of science fields, including mathematics. Additionally, [12] discovered that the problem-solving techniques of upper secondary students were mediocre and that there was a strong positive association and interplay among problem-solving techniques, social learning, and success in mathematics and science subjects.

Senior secondary school students showed a moderately good association between performance, and problem-solving techniques in the majority of science topics at that level, according to [4]. Several authors have also tackled the topic of a substantial disparity in the relationship between students' impressions of the social learning environment, their aptitude for problem-solving techniques and their academic success in senior secondary school. [12] used Vygotsky's socio-cultural theory (SCT) to find a weakly positive correlation between senior secondary school students' academic performance and their social learning environment. The authors continued by stating that there is no discernible relationship between students' academic success and the social learning environment in the majority of senior secondary school science subjects. While [4] discovered that there is a somewhat positive association between students' academic progress and their perception of their problem-solving techniques in the majority of senior secondary school science disciplines. The authors additionally asserted, based on the problem-solving technique theory (PSTT), that there is no discernible difference in the relationship between students' academic accomplishment and their assessment of their capacity for problem-solving in science classes in senior secondary schools.

The question of whether or not there is a correlation between students' success in senior secondary school scientific classes, their problem-solving techniques, and the social learning environment appears to have gone unanswered because both the evaluated theoretical and empirical research has yielded inconsistent and varied findings regarding the correlation between students' performance and the social learning environment or the correlation between students' performance and their perception of their techniques to solve problems. None appear to deal with the problems caused by the three factors. Comparably, the question of gender differences in the social learning environment, problem-solving techniques, and performance in scientific classes in senior secondary school remains unresolved and warrants more research. This research focused on the social learning environment and problem-solving techniques of senior secondary school students to gain a better understanding of how male and female students performed in scientific classrooms.

### **III. RESEARCH OBJECTIVE**

As a result, five objectives for the study emerge as thus: first the " correlation between academic performance in senior secondary school science subjects and secondary school students' perception of the social learning environment." second the "gender-moderated correlation between senior secondary science subject performance and secondary school students' perception of the social learning environment." third the " correlation between senior secondary school science subject performance and secondary school students' problem-solving techniques." fourth finding is the " correlation, when gender is moderated, between senior secondary school science students' performance and their technique to solve problems." fifth study examines the correlation between students' performance in senior secondary school scientific classes, their impression of the social learning environment, and their problem-solving techniques.

### **IV. RESEARCH QUESTIONS**

Based on the research objective, the following research questions were formed. They are below:

1. What is the correlation between secondary school students' perception of social learning environment and academic performance in senior secondary school science subjects?
2. What is the correlation between secondary school students' perception of social learning environment and performance in senior secondary school science subjects when moderated with gender?
3. What is the correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects?
4. What is the correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects when moderated with gender?
5. What is the correlation among secondary school students' perception of social learning environment, problem solving techniques and performance in senior secondary school science subjects?

Five Hypotheses, as mentioned below, were formed for all the questions for testing

1. There is no significant correlation between secondary school students' perception of social learning environment and academic performance in senior secondary school science subjects.
2. There is no significant correlation between secondary school students' perception of social learning environment and performance in senior secondary school science subjects when moderated with gender.
3. There is no significant correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects.
4. There is no significant correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects when moderated with gender.

- There is no significant correlation among secondary school students' perception of social learning environment, problem solving techniques and performance in senior secondary school science subjects.

## V. METHEDODOLOGY

The design of the study was correlation survey. Correlation design is used to investigate relationship between two or more variable without the researcher controlling or manipulating any of them. The area of the study was Onitsha education zones of Anambra state Nigeria. The population of the study comprised of all the 135000 senior secondary schools from SS1 to SS3 both public and private schools in Awka and Aguata education zones. The sample size of the study was made up of 1111 students (221 men and 890 females). The sample was drawn using standard Yamane 1967 which stated that a population is 100,000 and above the sample size should be 1111 at + or - 3 %. See below

Table 1. Sample size for  $\pm 3\%$ ,  $\pm 5\%$ ,  $\pm 7\%$  and  $\pm 10\%$  Precision Levels Where Confidence Level is 95% and  $P=5$ .

Size of Population	Sample Size (n) for Precision (e) of:			
	$\pm 3\%$	$\pm 5\%$	$\pm 7\%$	$\pm 10\%$
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1,000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100

a = Assumption of normal population is poor (Yamane, 1967). The entire population should be sampled.

Source: [21]

### Instrument

The Social Learning Environment Questionnaire (SLEQ), the Problem Solving Technique Inventory (PSTI), and the Students' Academic Performance Test (SAPT) were the three instruments employed in the study. The researchers modified the SLEQ based on Myint SweKhine's "What is happening in the classroom questionnaire" (WIHICQ) from 2001. There are seven (7) clusters that make up this model: cohesion among students, support from instructors, student participation, inquiry, task orientation, collaboration, and equity. A five-point rating system was employed, with the options being nearly never (1 point), seldom (2 points), occasionally (3 points), frequently (4 points), and always (5 points).

The second instrument was the researchers' modified the PSAI based on the social learning inventory-revised (SPSI-RD) by Zurilla available at [www.sax.sagepub.com](http://www.sax.sagepub.com). The problem-solving ability inventory was modified to include the following features: A modified scale was introduced, with weights of 1,2,3,4 and 4,3,2,1 for negative and positive responses, respectively, for Section A, which contained items eliciting information on the respondents' biodata, and Section B, which contained items eliciting information on problem-solving abilities. The instrument's 52 items were trimmed to 32 in accordance with the validator's suggestions.

The third instrument measures the academic performance of the students. The termly results, which comprise the first, second, and third terms in the subjects of Agricultural Science, Biology, Chemistry, Data Processing, Physics, and Mathematics, were derived from the promotion result for the 2021/22 academic session. Experts from the zones and the Head of Department of these subject areas verified the recorded findings in a preformat. Its reliability was not examined because it is a standard instrument.

Similarly, SLEQ and PSTI were validated by three experts. Two from Department of Science Education and one from Education Foundation (Measurement and Evaluation) all from Nnamdi Azikiwe University Awka. To test the consistency and reliability of the two instruments adapted, SLEQ and PSTI were administered to 60 students at Ogidi which is in Ogidi education zone which is outside the area of study and reliability of .71 and .73 were yielded using Cronbach alpha. Pearson product moment correlation was used to answer research questions and linear regression ANOVA was used to test the hypotheses at .05 level of significant.

Ranges of scores	Decision
$\pm 0.80 - \pm 1.00$	High positive or negative correlation
$\pm 0.31 - \pm 0.79$	Moderate positive or negative correlation
$\pm 0.00 - \pm 0.30$	Low positive or negative correlation

The null hypothesis is rejected when the P-value is less than or equal to 0.05 ( $P < 0.05$ ), according to the decision criterion used to interpret the null hypotheses. Conversely, in cases when the P-value exceeds the alpha threshold of 0.05 ( $P > 0.05$ ), the null hypothesis is accepted rather than rejected.

## VI. FINDINGS AND ANALYSIS

The result of this study was presented in line with the research questions and the hypotheses as follows.

### Research Question 1

What is the correlation between secondary school students' perception of social learning environment and academic performance in senior secondary school science subjects?



**Table 1: The correlation between academic performance in science subjects at senior secondary school and the social learning environment as measured by the Pearson Correlation Coefficient**

Variables	N	r	R <sup>2</sup>	Magnitude & Direction	Sig	Decision
SPSLE Performance in Science	1111	-0.03	0.00	Low negative correlation	0.876 <sup>b</sup>	Not Significant

Table 1 reveals correlation coefficients of the correlation between students' perception of social learning environment and academic performance senior secondary school science subjects as -0.03. This means there was a low negatively correlation between students' perception of social learning and academic performance senior secondary school science subjects.

### Research Question 2

What is the correlation between secondary school students' perception of social learning environment and performance in senior secondary school science subjects when moderated with gender?

**Table 2: The correlation between social learning environment and performance in science subjects at senior secondary school, moderated by gender, as represented in Pearson Correlation Coefficient**

Variables	N	r	R <sup>2</sup>	Magnitude & Direction	Sig	Decision
SPSLE Performance in Science	1111	-0.02	0.00	Low negative correlation	0.653 <sup>c</sup>	Not Significant

Table 2 reveals correlation coefficients of the correlation between secondary school students' perception of social learning environment and academic performance senior secondary school science subjects when moderated by gender as -0.02. This means there was a low negatively correlation between male and female students' perception of social learning and academic performance senior secondary school science subjects.

**Research Question 3**

What is the correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects?

**Table 3: Pearson Correlation Coefficient between Performance in Senior Secondary School Science Subjects and Problem Solving Techniques**

Variables	N	r	R <sup>2</sup>	Magnitude & Direction	Sig	Decision
PST Performance in Science	1111	0.03	0.001	Low positive correlation	0.653	Not Significant

Table 3 shown that correlation coefficients of the correlation between students' problems solving technique and academic performance scores in senior secondary school science subjects as 0.03. This means there was a low positive correlation between students' problem- solving technique and performance scores in senior secondary school science subjects.

**Research Question 4**

What is the correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects when moderated with gender?

**Table 4: The correlation between problem-solving techniques and performance scores in science subjects at senior secondary school, moderated by gender, as represented in Pearson Correlation Coefficient**

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Variables	N	r	R <sup>2</sup>	Magnitude & Direction	Sig	Decision
PST Performance in Science	1111	0.08	0.003	Low positive correlation	0.655 <sup>c</sup>	Not Significant

Table 4 shows correlation coefficients of the correlation between secondary school students' problem-solving techniques scores and performance scores in senior secondary school science subjects when moderated by gender as 0.08. This means there was a low positive correlation between male and female students' problem-solving ability and performance scores in senior secondary school science subjects.

### Research Question 5

What is the correlation among secondary school students' perception of social learning environment, problem solving techniques and performance in senior secondary school science subjects?

**Table 5: Ample Synthesis of Students' Views of the Social Learning Environment, Performance in Senior Secondary School Science Subjects, and Problem-Solving Techniques Scores**

Model & Direction	N	r	R <sup>2</sup>	Magnitude	Sig	Decision
	1111	0.03 <sup>a</sup>	0.001	Low positive correlation	0.58 <sup>b</sup>	Not Significant

Key: R<sup>2</sup> = coefficient of determination

Table 5 reveals how much of the overall variance of students' performance in senior secondary school science subjects is explained by the variables (students' perception on social learning

environment scores and problem solving techniques). Results showed that the correlation of the independent variables and the criterion variable was 0.03 and the coefficient of determination ( $R^2$ ) was 0.001. This means there was a low positive correlation between secondary school students' perception on social learning environment scores, problem solving abilities scores and performance scores in senior secondary school science subjects.

## Hypotheses

**H<sub>01</sub>:** There is no significant correlation between secondary school students' perception of social learning environment and academic performance in senior secondary school science subjects.

Table 2 revealed the Pearson correlation coefficient for the correlation between secondary school students' perception of social learning environment and performance score in senior secondary school science subjects. A low negative correlation was found  $r(1420) = -0.03$ ,  $p = 0.00 > 0.05$ ) indicating a no significant correlation between the two variables. The null hypothesis which stated that there is no significant correlation between secondary school students' perception of social learning environment scores and performance scores in senior secondary school science subjects was therefore not rejected. The inference drawn was that there is no significant correlation between secondary school students' perception of social learning environment scores and performance scores in senior secondary school science subjects.

**H<sub>02</sub>:** There is no significant correlation between secondary school students' perception of social learning environment and performance competence in senior secondary school science subjects when moderated with gender.

Table 2 revealed the Pearson correlation coefficient for the correlation between secondary school students' perception of social learning environment and performance in senior secondary school science subjects when moderated with gender. A low negative correlation was found  $r(1420) = -0.02$ ,  $p = 0.00 < 0.05$ ) indicating no significant correlation between the two variables. The null hypothesis which stated that there is no significant correlation between secondary school students' perception of social learning environment and performance in senior secondary school science subjects when moderated with gender was therefore not rejected.

**H<sub>03</sub>:** There is no significant correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects.

Table 3 revealed the Pearson correlation coefficient for the correlation between secondary school students' problem solving techniques and performance score in senior secondary school science subjects. A low positive correlation was found  $r(1420) = 0.03$   $p = 0.00 > 0.05$ ) indicating a no significant correlation between the two variables. The null hypothesis which stated that there is no significant correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects was therefore not rejected. The inference

drawn was that there is no significant correlation between secondary school students' problem-solving techniques and performance in senior secondary school science subjects.

**H<sub>04</sub>:** There is no significant correlation between secondary school students' problem solving techniques and performance in senior secondary school science subjects when moderated with gender.

Table 4 revealed the Pearson correlation coefficient for the correlation between secondary school students' problem-solving techniques and performance in senior secondary school science subjects when moderated with gender. A low positive correlation was found  $r(1420) = 0.08$  ( $p=0.00 > 0.05$ ) indicating a no significant relationship between the two variables in senior secondary school science subjects when moderated with gender. The null hypothesis which stated that there is no significant correlation between secondary school students' problem-solving techniques and performance in senior secondary school science subjects when moderated with gender was therefore not rejected. The inference drawn was that there is no significant correlation between secondary school students' problem-solving techniques and performance in senior secondary school science subjects when moderated with gender.

**H<sub>05</sub>:** There is no significant correlation among secondary school students' perception of social learning environment, problem solving techniques and performance in senior secondary school science subjects.

Table 5 revealed the Pearson correlation coefficient among secondary school students' perception of social learning environment, problem solving technique and performance in senior secondary school science subjects. A low positive correlation was found  $r(1420) = 0.03$  ( $p=0.00 > 0.05$ ) indicating a no significant correlation between the three variables. The null hypothesis which stated that there is no significant correlation among secondary school students' perception of social learning environment, problem solving technique and performance in senior secondary school science subjects was therefore not rejected. The inference drawn was that there was no significant correlation among secondary school students' perception of social learning environment, problem solving technique and performance in senior secondary school science subjects.

## VII. DISCUSSION AND IMPLICATIONS

The finding revealed a low negatively correlation between students' perception of social learning and academic performance in senior secondary school science subjects. Hence there was no significant correlation between students' secondary school students' perception of social learning environment scores and academic performance scores in senior secondary school science subjects. The results are in line with those of [5], who discovered no appreciable variations in senior secondary school science students' performance and classroom environment, but not with [12], who discovered a weakly positive correlation between students' academic achievement and their social learning environment using Vygostsky's socio-cultural theory (SCT). There is no discernible

correlation between senior secondary school science students' performance and their opinions of the social learning environment. This may be due to the fact that students are more engaged in extracurricular activities than in learning science subjects at the senior secondary school level, and they frequently find themselves in unstable situations in the classroom, such as playing about.

The result revealed a low negative correlation between male and female students' perception of social learning and academic performance in senior secondary school science subjects. Hence, there is no significant correlation between secondary school students' perception of social learning environment and performance in senior secondary school science subjects when moderated with gender.

The result validates [2] findings, which indicate that academic performance, especially for male and female mechanical students, is significantly impacted by a well-equipped and no appreciable difference in the perspectives of the two gender groups, and the learning atmosphere is flexible with knowledgeable teachers. These findings have led the research to be included in the body of knowledge that maintains that there is no significant correlation, when gender is controlled, between secondary school students' perceptions of the social learning environment and their performance in senior secondary school science subjects, and that there is a low negative correlation between male and female students' perceptions of social learning and academic performance in these subjects.

The finding also shows a low positive correlation between students' problem-solving ability and performance scores in senior secondary school science subjects. Hence, there was no significant correlation between secondary school students' problem-solving ability scores and performance in senior secondary school science subjects.

The outcomes were at odds with those of [4], who discovered a marginally positive correlation between students' performance, attitudes, and problem-solving techniques in senior secondary school science classes. The results also go against the findings of [12], who discovered that there was a strong positive correlation and association between problem-solving techniques, higher secondary students' problem-solving techniques, social learning, and performance in mathematics and other senior secondary school science subjects. Furthermore, the results conflict with those of [4], who discovered a somewhat favorable correlation between students' academic performance and their assessment of their capacity for problem-solving in scientific classes at the senior secondary school level. More so, the findings run counter to those of [20], who discovered a statistically significant difference in the relationship between students' problem-solving techniques and their performance in mathematics and other senior secondary school scientific subjects. The lack of a significant correlation between students' problem-solving techniques and academic performance competence in senior secondary school science subjects, as well as the low positive correlation between students' problem-solving techniques and performance competence scores, may indicate that students' problem-solving techniques serve as a forward catalyst for success.

The result shows a low positive correlation between secondary school students' problem-solving technique scores and performance scores in senior secondary school science subjects when moderated by gender. Hence, there is no significant correlation between secondary school students' problem-solving techniques and performance in senior secondary school science subjects when moderated with gender. The findings are in line with those of [2], who discovered that there was no discernible difference in gender group opinions since students' perceptions of their problem-solving techniques were equal. Using the problem-solving technique theory (PSTT), [4] found no discernible differences in the relationship between students' academic achievement and their perception of their technique to solve problems in science classes in senior secondary schools.

The data from the study shows low positive correlation between secondary school students' perception on social learning environment scores, problem solving technique scores and performance competence scores in senior secondary school science subjects scores. The inference drawn there is no significant correlation between secondary school students' perception of social learning environment, problem solving technique scores and performance competence scores in senior secondary school science subjects. The findings of this study are in opposition to those of [12], who discovered that problem-solving technique among upper secondary students were mediocre and that there was a significant positive correlation between problem-solving skills, social learning, and academic performance in mathematics and other science subjects. The results of the study have led to the joining of the school of thought that proposed no significant correlation between the performance in senior secondary school science subjects, the scores on tests of problem-solving technique, and the perceptions of the social learning environment held by secondary school students.

Based on the study, the following recommendations are made to the stakeholders (school management, education policy makers, teachers, future researchers, students, etc) for implementation and further investigations.

- In order to develop a deeper grasp of their talents, science students in their senior year of secondary school should always make use of the social learning environment that is available to them and apply problem-solving techniques to everyday scenarios.
- Science teachers should endeavor to assist students in developing and internalizing the right problem-solving techniques so they can have the right frame of mind for successful academic performance.
- Governments should provide enough funding for counseling services in schools so that teachers can monitor students' academic progress and proficiency in science subjects.

## **VIII. CONCLUSION AND FUTURE WORK**

An objective of this paper is to investigate the science students' performance in senior secondary school as influenced by social learning environments and problem-solving techniques: Does the correlation's gender moderate it? The paper herein use multiple correction analysis in field of

Statistical Package for Social Science (SPSS) version 25. From the result there is a marginally negative correlation between students' academic technique in senior secondary school science classes and their judgments of social learning; however, this correlation is not statistically significant. Second, academic performance in senior secondary school science classrooms was found to be negatively correlated, albeit not significantly, with male and female students' evaluations of social learning.

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