Journal of Education, Learning, and Management (JELM)

ISSN: 3079-2541 (Online)

Volume 2 Issue 1, (2025)

https://doi.org/10.69739/jelm.v2i1.467

https://journals.stecab.com/jelm

Published by
Stecab Publishing

Research Article

Investigating Factors Affecting Secondary Students' Science Performance: Evidence From Choma District, Zambia

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About Article

Article History

Submission: March 16, 2025
Acceptance : April 20, 2025
Publication : May 24, 2025

Keywords

Environment, Factors, Poor Performance, Science

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ABSTRACT

Using Mbabala Day Secondary School, St. Marks Boarding Secondary School, and Simunzele Day Secondary School in the Choma District of Southern Province as examples, the study looked at the factors that contribute to low performance among science students in Zambia. The purpose of this study was to examine the factors that lead to subpar science performance as well as the availability of science teaching and learning resources in Choma District secondary schools. 45 students in all were chosen from the three schools using a descriptive research design. These students belonged to the Grades 10, 11, and 12 classes. Three parents from each of the three schools' surrounding communities and nine teachers from the three schools themselves were also chosen. Participants in the study were chosen using purposive sampling, a non-probability sampling technique. Semi-structured interviews with parents, focus groups with students, and key informant interviews with teachers were used to collect data. Data analysis was done using thematic analysis. According to the study's main findings, students' negative attitudes toward science and a lack of resources—such as textbooks—as well as crowded classrooms, a lack of discipline, poor conceptual comprehension, a lack of laboratory equipment and resources, non-compliance with Curriculum Assessment Policy Statements, inadequate or incomplete lesson plan preparation by teachers, and a lack of teaching and learning materials are common causes of poor performance. It is advised that the government make sure the schools have all the supplies they require. To inspire students and maintain their interest in science, teachers should employ contemporary teaching techniques.

Citation Style:

Gwanda, J., & Chibesa, F. (2025). Investigating Factors Affecting Secondary Students' Science Performance: Evidence From Choma District, Zambia. *Journal of Education, Learning, and Management, 2*(1), 177-185. https://doi.org/10.69739/jelm.v2i1.467

1. INTRODUCTION

Globally, there is significant concern over the high rate of underachievement in science at the high school level (Fonseca & Conboy, 2006). As a result, some countries—such as the United States of America and Zanzibar, for instance—have already begun to urge all citizens—with a focus on schools, parents, industry, government, and the scientific community—to work together to address low high school science performance in order to guarantee more positive outcomes in the future (Yussuf, 2007). It is alarming to learn that Zambia has also seen comparable patterns of poor scientific accomplishments (ECZ, 2015).

The main and most noticeable trend that emerges from all of these countries and others is that low high school science achievement remains a significant worldwide issue (Kanyongo *et al.*, 2007). Given how heavily science depends on each nation's wealth and economic development, it is crucial to address this issue for sustainable development (Muwanga-Zake, 2008). Despite significant international efforts to boost scientific literacy and the scientific workforce (Muwanga-Zake, 2008), it has recently been recognized that science education systems are producing fewer science graduates at all levels than the world economy needs (Cameroon, 2009; Einhorn, 2008). So, it might make sense to say that the previously mentioned drop in science graduates is a reflection of a global failure to excel in science at the secondary school level (Fonseca & Conboy, 2006). The lack of qualified science teachers is the primary issue associated with students' subpar performance in science in the majority of developed nations (Ruby, 2006). Research indicates that a lack of qualified teachers is linked to less content coverage and inadequate lesson planning (Ruby, 2006). On the other hand, the majority of developing nations, including South Africa, have a number of issues. These include inadequate science facilities and resources, such as labs and equipment, a lack of teachers with the necessary training, large science classes, low proficiency in the medium of instruction, and antiquated teaching methods (Howe, 2003). At the Grade Twelve level, the growing number of science failures in Zambia remains a disgrace and a serious worry, particularly in public high schools in rural areas (Chileya, 2016). That science underachievement in these schools is soaring at a time when the ability to apply science to daily life and world events is growing exponentially is alarming. The underlying causes of students' poor performance in science, especially in Zambia's public schools, may then be implied to have not yet been thoroughly investigated or adequately addressed.

Both domestically and internationally, poor scientific performance remains a problem. Until the cause is identified, it will remain a challenge. The following section will address the factors that contribute to students' poor performance in science and math. According to Howe (2003), teachers' job is to make learning meaningful for each student by providing the best resources and learning environments. Around the world, people are concerned about the problem of inadequate resources in schools. Students have become disinterested in the subject and have performed poorly as a result of the lack of resources, including textbooks, physical infrastructure, and laboratory equipment (Muwanga-Zake, 2008). In their 2006 study, Makgato and Mji compared schools with and without resources and discovered that the latter performed worse, which lends credence to the aforementioned claim. The subject is only taught in theory when there are insufficient resources available, which hinders effective learning (Onwu, 1999; Dhurumraj, 2013). Consequently, research suggests that for science instruction and learning to be effective. Teaching strategies are a set of teaching-learning activities that teachers create to assist students in reaching a predetermined learning objective, according to Vassallo (2014). When presenting the learning material to students, a teacher can employ a variety of techniques. based on Kibet *et al.* (2012). Physical scaffolding is essential in content-area teaching because vocabulary instruction with verbal, visual, and physical support is more effective. According to Kirschner *et al.* (2009), most teachers have left their science behind after graduating from college, possibly influenced by their personal interests and sporadic in-service training.

In order to succeed in science, one must be able to understand the concepts and express them in writing. Lebata (2014) asserts that, frequently with good reason, science has been emphasized as a practical subject in secondary education because it is partially an empirical field. However, learning the language of science is the biggest challenge for many students and the most significant accomplishment in science education. Along with understanding theories and being able to apply them, science also demands the ability to analyze data from diagrams and express it verbally (Hlabane, 2014). Reading, writing, and communication skills are obviously necessary for this subject (Hlabane, 2014).

1.1. Problem statement

Underachievement in science in secondary schools has been noted as a significant worldwide issue (Fonseca & Conboy, 2006). Since the ability of a nation's scientific workforce directly affects its wealth and economic development, nations all over the world have recognized the necessity of addressing this issue for sustainable development. In the world's least developed nations, the situation seems pitiful. It is alarming to learn that Zambia has also reported similar patterns of low science achievement among secondary school students (ECZ 2015). The lack of basic science infrastructure, a shortage of qualified science teachers, and a lack of teaching resources to support appropriate science education are the most frequent issues associated with students' poor science performance in developing nations like Zambia (Ruby, 2006). According to King'aru (2014), student underachievement in Zambian schools has persisted unchecked. Because basic facilities that support science education appear to be lacking, the state of science education for students in the majority of rural secondary schools is concerning. With this context in mind, the purpose of this study is to investigate the perceived causes of subpar performance among science students in a few secondary schools in Zambia's Choma District. Research is necessary to identify the factors that contribute to poor performance because they continue to harm local students.

1.2. Purpose of study

First and foremost, this study would add to the body of knowledge

in science education and produce new knowledge, which is one of its many significant aspects. Second, by producing empirical findings for decision-making regarding improvements in science education, this study would produce information that could be utilized by a variety of stakeholders, including the Ministry of General Education, nongovernmental organizations, families, and the Ministry of Higher Education. Principals and educators could use the study's findings to implement learner-centered teaching strategies in their classrooms, potentially enhancing the teaching and learning process. Additionally, in order to provide high-quality education, science teachers can use this information to support students' independent and critical thinking by employing learner-centered approaches. These elements are crucial for learning how to recognize, evaluate, solve, and build confidence in addition to providing the highest caliber of education (Wigfield & Eccles, 2000).

2. LITERATURE REVIEW

Teaching and learning materials are learning devices and aids via which learning and teaching are carried out in school (Machaba, 2013). They are tools used during learning activities, which consist of vigorous learning and measurement including every resource as well as any means a teacher employs for implementation of instructions and provide learners attainment of learning objectives. According to Cubillas (2020), visual resources are effectual in passing on concepts and content in an easy way compared to oral descriptions for visual pupils and they are significant enhancements of learning in the classroom. Course content supplemented with diagrams, videos, visual representations charts, maps, photographs and diagram, pupils absorbs it easily (Kurgatt & Omuna 2016). A study by Makokha and Wanyonyi (2015), examined that there is shortage on learning materials availability and that educators carry out their teaching on talk and chalk techniques in training developments of language skills. Adeogun (2001) discovered a very strong positive significant relationship between instructional resources and academic performance. Mwiria (1985) also supports that students' performance is affected by the quality and quantity of teaching and learning materials. The Kenya Education Sector Support Programme (2005-2010) cites mobilization, prioritization and utilization of resources as some of the problems facing mathematics and science subjects in secondary schools. Fuller (1986) has reported the same on studies in Uganda and Peru while Indoshi (1993) argues that the use of text books among other materials raises academic standards and efficiency of a school system. A study conducted to investigate the resources allocated to science in secondary schools, in Nigeria between 2003 and 2006, indicated that the resources allocated to the aforementioned subject disciplines were inadequate irrespective of the subject (Uche *et al.*, 2011). A pilot survey of schooling conditions in eight least developed countries of Africa conducted by UNESCO and UNICEF found that half the pupils in secondary schools had no text books (Montagnes, 2000). The study reported that few books were available in Angola, Tanzania and Zambia; in Kenya, Nigeria and Sierra Leone the pupil: text book ratios were between 10:1 and 28:1 implying that one or two text books per class. According to research findings, large classes force the teachers to make use of a teacher centered teaching approach since letting students lead teaching and learning becomes impossible because of the fact that the teacher cannot attend to each learner individually (Akinsolu & Fadokun, 2009; Setati, 2011; Yelkpieri *et al.*, 2012:327; Mwenda *et al.*, 2013: Dhurumraj, 2013). Research shows that learners taught by unqualified teachers or qualified teachers who do not understand the nature of science that has to be taught produce poor results (Dekkers & Mnisi, 2003; Ogbonnaya, 2011; Lebata, 2014). Research also shows that there are still large numbers of under-qualified or unqualified teachers who teach science subjects (Cho *et al.*, 2012; Makgato & Mji, 2006; Makgato, 2007; Modisaotsile, 2012).

3. METHODOLOGY

This study is important in many ways; firstly, it would generate new knowledge and contribute to the body of knowledge in science education. Secondly, this study would generate information which could be used by various stakeholders such as the Ministry of General Education, nongovernmental organisations, families as well as the Ministry of Higher Education by providing empirical findings for decision making regarding improvement in science education. The specific objectives of this study were: to explore the availability of teaching and learning materials of Science in secondary schools of Choma District, to assess the teaching and learning environment of science education in selected secondary schools of Choma District, and to establish the difficulties pupils faced in learning science education in selected secondary schools of Choma District.

In order to concentrate on self-efficacy, outcome expectations, and personal goal setting, the study used the Social Cognitive Theory (SCT) framework (Zimmerman & Schunk, 2001) and discusses environmental elements such as the school environment and the socialization process that may affect students' performance in science (Lent & Hacket, 1994). 45 students from the three schools were chosen as the study's target population using a descriptive research design. These students were in classes in Grades 10, 11, and 12. Three parents from each of the three surrounding communities and nine teachers from the three schools were also chosen, for a total sample size of 63 participants. This is because purposive sampling can allow researchers to connect with individuals or groups they already know or who are recommended by trusted sources, fostering stronger relationships and potentially improving data quality. Key informant interviews were utilized to gather information from teachers, and focus groups were employed to gather information from students. Similar concepts were grouped into the emerging themes for qualitative analysis of the collected data. The identified themes were then used to present the data in accordance with the research questions. The researcher ensured that the selected schools and teachers are representative of the broader population in Choma District as to minimize biasness in data collection and analysis by using standardized instruments and protocols. The researcher compared data from different sources to enhance the validity and reliability of the findings.

4. RESULTS AND DISCUSSION

In this chapter, the general results of the study on the causes

of students' subpar performance in science classes at particular Choma District schools were provided. The results are shown in accordance with the goals of the investigation.

4.1. Investigating the resources for instruction and learning that are available.

The findings by King'aru (2014), Ngema (2016), Chileya (2016), Mwaba (2011), and Mamalanga and Awelani (2014) are similar to the findings that a lack of teaching and learning resources, such as books and laboratories, affects students' poor performance in science courses. Students who lack books may be forced to rely on their teachers' notes because they lack resources for accessing scientific knowledge. Additionally, it implies that students might not read ahead of the teacher. However, reading ahead of the teacher creates advance organizers that are necessary for subsequent learning (Ausubel, 1968).

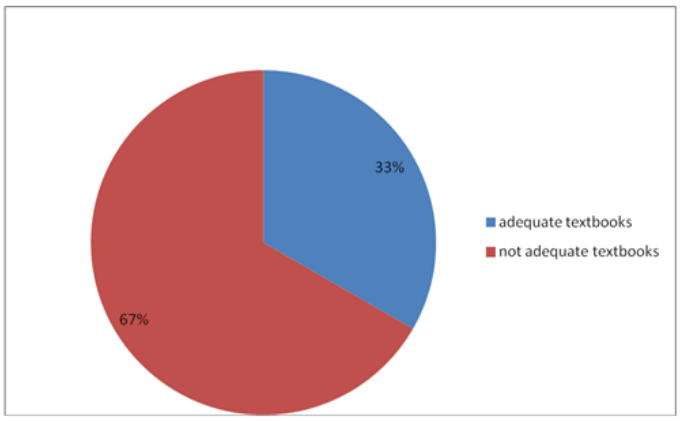

Figure 1. Shows availability of textbooks in schools

Figure 1 lists the textbooks that are available in schools. Insufficient science education textbooks were available at the schools chosen for this study. 30 out of 45 students, or 66.7 percent, who participated in the study mentioned that science education textbooks were insufficient in these schools, according to the findings. Fifteen participants, or 33.3% of the sample, stated that the three chosen schools had the necessary textbooks.

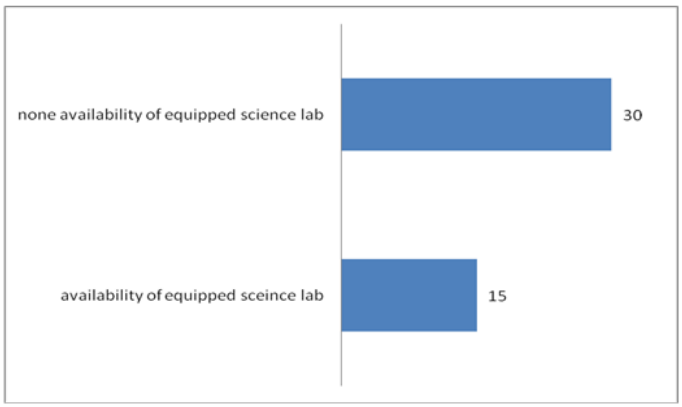

Figure 2. Shows availability of equipped lab

In Figure 2, Point 1. 2 displays which schools have a fully furnished science lab available. The results showed that only 15 out of 45 participants, or 33 percent, said their schools had equipped science laboratories, while 30 out of 45 participants, or 66 percent, said their schools lacked chemistry and physics labs. According to a student at the school without lab space, learning from scratch makes it difficult for us to understand concepts, particularly in chemistry. Without lab facilities, we are unable to put what we learn in class into practice.

4.2. Evaluating the scientific education teaching and learning environment in a few chosen schools.

Figure 3.1.2 displays which schools have a fully furnished science lab available. The results showed that only 15 out of 45 participants, or 33 percent, said their schools had equipped science laboratories, while 30 out of 45 participants, or 66 percent, said their schools lacked chemistry and physics labs. According to a student at the school without lab space, learning from scratch makes it difficult for us to understand concepts, particularly in chemistry. Without lab facilities, we are unable to put what we learn in class into practice.

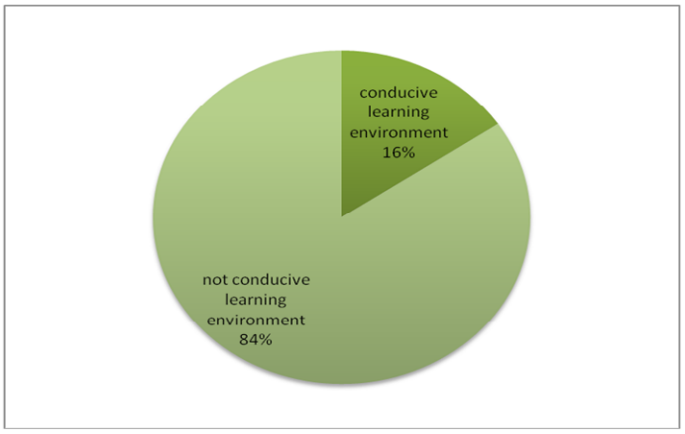

Figure 3. Shows how conducive the learning environment is

Figure 3 shows how conducive the learning environment is. The degree to which the learning environments in particular schools were favorable is shown in 1. Because of the presence of adequate teaching and learning resources, the minimum number of students per class, qualified science teachers, and well-equipped labs, only seven out of forty-five participants, or fifteen and six percent, reported having a conducive learning environment for science education. In contrast, 38 out of forty-five participants, or eighty-four percent, reported that they lacked a conducive environment for learning science education because of a lack of teaching and learning resources, overcrowded students, qualified science teachers, and well-equipped labs. The Social Cognitive Theory concurs that elements in the academic setting fundamentally influence classroom learning. On the subject of science, it was found that most students felt that the atmosphere was not suitable for learning. As previously mentioned, there were insufficient science teachers, labs, and supplies in the schools to create

a favorable learning environment. The majority of schools lack laboratory equipment, which hinders science instruction because science should be taught and learned primarily through experiments and practicals.

4.3. Identifying the challenges that students encountered when learning science

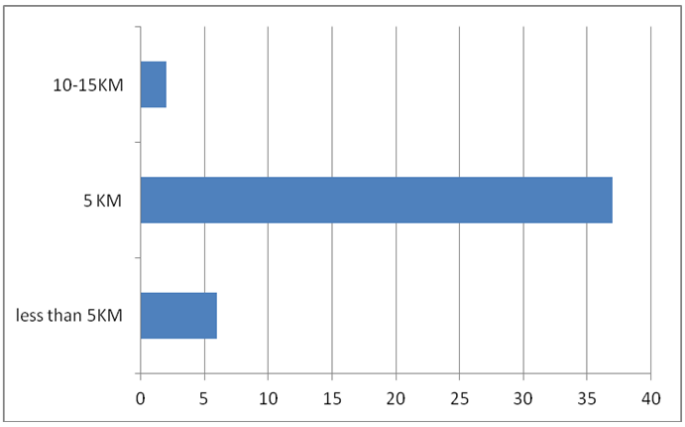

Figure 4. Shows the distances learners cover on a daily basis to and from school.

The results indicate that 37 out of 45 students who participated in the study walked a distance of 5 to 10 kilometers, or 82% of the total. These students were followed by those who walked a distance of less than 5 kilometers, or 6 out of 45, or 13.3 percent, and those who walked a distance of roughly 10-15 kilometers, or 45% of the total. One of the students mentioned that it takes her roughly two and a half hours to get to school after waking up at four in the morning. I am always exhausted when I get to school, which makes it difficult for me to focus in class. I always get home so late in the evening that I don't have time to study at all. Researchers Kelly and Kanyika (2000) found that students' commute times have a negative impact on their academic performance because they are more likely to arrive late and study less than their peers who live close to the school. They might also be too exhausted to complete their homework when they get home. Furthermore, it was discovered by Mbozi (2008) that students who walked many kilometers to school each day arrived exhausted, making it difficult for them to focus class. They consequently performed poorly (Muchimba, 2010). According to roughly half of the villages in Birdsall and Francois' (1996) study on the connection between location (distance) and school attendance in Mali, many children could not be enrolled by their parents because the school was so far away.

The majority of Zambian schools, according to Mulopo (2010), are marked by overcrowding, which has historically had a detrimental effect on students' academic performance. Higher teacher-to-student, student-to-classroom, student-to-book, and student-to-desk ratios are the reason for this. He continues by saying that these issues, which include a packed classroom and insufficient seating, make learning unpleasant and encourage student absenteeism (Ndoye, 2007). Additionally, teachers are unable to provide each student with individualized attention, which disadvantages slow learners who would have benefited from remedial and individualized instruction. Additionally, according to Mbozi (2008), students were unable to focus due to overcrowding, and teachers neglected to mark books and avoided using group projects as a teaching strategy.

Table 1. Represents the difficulties pupils faced in learning science.

Challenge	Strongly agree	Agree	Undecided	Strongly disagree	Disagree
lack of enough classroom space	21	10	4	10	
lack of labs	32	6			7
long distance to school	31	12			2
lack of equipments to use for experiments	37	8			
shortage of science teachers in schools	29	12			4
lack of textbooks	32	13			
difficulties in understanding concepts	17	22			6

Table 1 highlights the perceived challenges learners faced in learning science, 21 out of 45 strongly agreed that lack of enough classroom space was one of the challenges being faced by pupils, 10 out of 45 participants agreed that lack of enough classroom space was one of the challenges being faced by pupils, 10 out of 45 participants strongly disagree that classroom space was one of the problems being faced while 4 out of 45 participants remained undecided on the matter. 32 out of 45 participants strongly agreed that lack of laboratories was one of the challenges being faced by pupils, 6 out of 45 participants agreed that lack of laboratories was one of the challenges being faced by pupils while 7 out of 45 participants disagreed that lack of laboratories was one of the challenges being faced by pupils. 31 out of 45 participants strongly agreed that long distance to school was one of the challenges being faced by pupils, 12 out of 45 participants agreed that long distance to school was one of the challenges being faced by pupils while 2 out of 45 participants disagreed that long distance to school was one of the challenges being faced by pupils. Some students live as far away as 10 kilometers from the school, according to one teacher. They are exhausted by the time they get to school. All of the teachers mentioned a lack of science textbooks, a lack of science teachers, a lack of equipment for use in the labs, and problems with students' comprehension of scientific

concepts. Community members believed that students had some difficulties learning science; nine members mentioned a lack of classroom space; seven mentioned a lack of science teachers; six mentioned being close to social amenities like bars that typically played loud music during class; seven mentioned that students frequently chose to skip lessons in order to raise money for school fees and household expenses; three members mentioned a lack of libraries; two mentioned a lack of internet resources for research; and six mentioned long commutes to school.

4.4. Discussion of the findings

The study's primary goal was to investigate the availability of science teaching and learning resources in the Choma district. Similar to findings by Kostelnik *et al.* (2009) the results showed that students' poor performance in science classes was caused by a lack of teaching and learning resources, including books and labs. As the primary goal, the availability of teaching and learning resources in Choma District's secondary schools was examined in 2009 and Muzah (2011). It was found that all three of the district's secondary schools lacked sufficient resources. Of the three secondary schools, one lacked a science lab entirely, and the ones that did had no necessary supplies like chemicals and equipment. The majority of schools lack laboratory equipment, which hinders science instruction because science should be taught and learned primarily through experiments and practicals. Mwaba (2011) discovered, however, that eight of the eleven teachers polled did not think about incorporating experiments into a respiration lesson, citing a lack of lab equipment as the reason. Consequently, educators turn to the passive voice.

Evaluating the teaching and learning environment for science instruction in a few chosen secondary schools was the other goal. The findings showed that there was a shortage of space in the schools with science labs. Both preparations and instruction took place in the same room. Since the majority of teaching and learning took place in classrooms rather than other facilities, Dudek (2000) found that having enough classrooms was the best prerequisite for accessing education. There is no other option in the classroom. Additionally, these results supported the findings of Muwanga-Zake (2000), who found that students in New York City's overcrowded schools performed noticeably worse in science and other subjects than those in schools with adequate infrastructure. To accommodate the growing number of students in the schools, every student recommended that more classrooms be constructed. This study revealed that sufficient infrastructure needed to be built in order to house all of the students. Additionally, it was observed that the excessively high student-teacher ratio made it challenging for the students to understand. This demonstrated that there were a lot of students.

The students were also asked how their science teachers inspired them, and every student responded that their teachers inspired them to work hard in science since the majority of successful jobs in the world were in the field. All of the students reported that their teachers inspired them by warning them that hard work in the sciences was the only way to become a doctor or nurse. Good infrastructure encourages teaching and learning, according to Gardner and Hill (1999); classrooms, labs, and libraries should be strategically placed and furnished. Regarding this issue, the majority of educators stated that the three chosen schools' educational environments had a detrimental effect on students' performance in chemistry and physics. The students' performance was negatively impacted by the negative attitude they had toward the subject and the belief held by the communities that science was a difficult subject for students to understand. The students were also asked how their science teachers inspired them, and every student responded that their teachers inspired them to work hard in science since the majority of successful jobs in the world were in the field. All of the students reported that their teachers inspired them by warning them that hard work in the sciences was the only way to become a doctor or nurse. Good infrastructure encourages teaching and learning, according to Gardner and Hill (1999); classrooms, labs, and libraries should be strategically placed and furnished. Regarding this issue, the majority of educators stated that the three chosen schools' educational environments had a detrimental effect on students' performance in chemistry and physics. The students' performance was negatively impacted by the negative attitude they had toward the subject and the belief held by the communities that science was a difficult subject for students to understand.

The third goal was to determine the challenges that students in a few Choma District secondary schools faced when learning science. Participants in this study reported a wide range of difficulties they encountered when learning science. This is comparable to the findings of Patterson (1990), who found that conceptual explanations, calculations, graphs, and experiments could all be considered challenges in representing the scientific formulas. Although a good learning environment was linked to good academic performance, Dudek (2000) found that uncomfortable and inappropriate classrooms reduced learning opportunities by causing issues like short attention spans, writing difficulties, and illness.

Low performance was caused by the student seeing the equipment for the first time during the exam period. They had never had the opportunity to practice or use the equipment. Self-efficacy and outcome expectations were found to have an impact on performance in relation to the Social Cognitive Theory. It has been observed that students who have higher levels of self-efficacy beliefs and outcome expectations set and strive for more difficult academic objectives than those who have lower levels of these beliefs or less optimistic expectations for their academic performance. The results also demonstrated that students' ability to learn to the fullest extent possible was hampered by a shortage of qualified science teachers. This was also in line with the Social Cognitive Theory, which held that since schools lacked labs and equipment, it was impossible to improve science performance.

5. CONCLUSION

According to the discussion in the previous captioned heading, the study's results showed that students' performance in science was significantly impacted negatively by a lack of teaching and learning resources. If students participated in hands-on learning under the supervision of knowledgeable and experienced teachers, the science performance in the secondary

schools under investigation could be raised. Their performance would improve as a result of this since it would boost their motivation and alter their perspective on science courses.

According to the study's primary findings, students' performance was generally impacted by the lack of teaching and learning resources. These resources must be made accessible and of high quality in order to yield precise results during practical sessions. Since these students needed that knowledge for their future careers, the other schools chose to employ non-applicable alternatives to practicals and lacked any equipment at all.

Some secondary schools' teaching and learning environments were determined to be unsuitable for science classes. There was only one laboratory at one school, and the hands-on instruction took place in the classroom. As a result, parents, the government, and society at large should make sure that the environment is favorable for learning to occur.

The study's conclusions showed that students' distaste for science was one of the main challenges teachers encountered when instructing the subject. Their performance suffered as a result of their discouragement that science was always more difficult than other subjects.

RECOMMENDATION

The following suggestions were made for stakeholders, the government, and interested NGOs to support the improvement of science learner performance at the district and national levels in light of the study's findings and conclusion.

It is imperative that teacher education programs work hard to support educators in becoming more adept at incorporating their knowledge of the nature of science into their instruction. Understanding the nature of science should also be promoted as a significant educational goal in and of itself for educators. For this reason, good educational outcomes depend on teachers receiving ongoing, high-quality development.

Programs for teachers' effective professional development usually include expanding and deepening their understanding of science material, modeling the teaching of new material, and learning best practices that help teachers engage their students in and support their efforts to conduct scientific research. Teachers of natural sciences require sufficient assistance from the subject facilitator. Every activity occurs within the boundaries established by the school, and all significant decisions and actions are intended to be influenced and determined by the policy.

In order to prepare their senior-phase students for future education and careers, natural science teachers should consistently implement programs that enhance their knowledge, abilities, and attitudes. A range of visual aids, such as diagrams, pictures, and drawings, should be used to support spoken instructions. Textbooks are a reliable source of information that contains all pertinent information and indicates the truth. Teachers attempt to come up with innovative solutions to overcome the lack of resources that students will encounter. Teachers shouldn't give up on something just because they can't due to a lack of resources. During instruction, teachers repeat words to the students. It is necessary to organize science fairs in order to inspire students to conduct scientific experiments and thereby ignite their curiosity about the field of science.

Teachers ought to assist students in gathering and analyzing data. Without an illustrative preamble, learners might not find it beneficial to confront scientific definitions and formulas (many of which are abstract) unless they have already been adequately exposed to the concepts in question. Science instructors use literacy techniques in their classes and give their students chances to practice academic language fluency through speaking, writing, listening, and reading. Fluency will improve as students progress toward scientific literacy by using academic language specific to science in various activities. Fundamental ideas must be grasped before attempting more complex subjects because scientific knowledge is inherently constructed from simpler to more intricate components. Teachers must differentiate their instruction in accordance with the general approach in order to meet the needs and skills of their students. To increase their understanding of science, students require a library with internet access.

The value of practical work in science classes is generally acknowledged, but it's crucial to ensure that it actually enhances learning and instruction and that teachers have the freedom to design and implement programs that cater to the needs of their students. These programs should, in turn, be in line with the subjects that the students are studying. Making the phenomenon real, sustaining interest, and encouraging logical thinking are all crucial in science instruction if one hopes to get students to actively participate in the lesson.

Given the increasing importance of science and technology in contemporary societies, scientific literacy is regarded as a crucial educational goal for all students by the end of their education, not just aspiring scientists. By incorporating real-world applications of science into their lessons and encouraging students to discuss and debate pertinent and inspiring material, teachers can assist students in participating in society's scientific discussions. The processes and endeavors that result in the advancement of scientific knowledge are referred to as scientific inquiry (Howe, 2003). Inquiry instruction, which fosters comprehension of scientific concepts and science literacy, is one way that teachers support science literacy since it is crucial to learning natural science.

Teachers in the intermediate and senior phases are in charge of teaching during a critical time in a child's development. Teachers use a variety of pedagogical interventions to steer class discussions. Bossaert *et al.* (2011) points out that teachers have a significant role in the classroom, especially when it comes to lesson and unit planning. As such, they must be skilled in determining the best teaching strategies and objectives, analyzing content, organizing learning opportunities and experiences, taking into account teaching strategies, organizing positive learning events in a sequence, and assessing their results to maximize their impact. In order to achieve the intended result, teachers are urged to complete their lesson plans in an effective and efficient manner. In large classes, students should sit close to one another so that everyone can benefit from the teacher's attention with the least amount of disturbance. The teacher should also walk around the classroom to keep an eye on groups, offering guidance and support when needed. Students' awareness of other students'

perspectives on specific concepts should be sparked by group discussions. Teachers ought to assist students by every time.

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