



INVESTIGATING FACTORS INFLUENCING GRADE 9 AND 12 LEARNER-PERFORMANCE IN SCIENCE – VIEWS OF SCHOOL ADMINISTRATORS, TEACHERS, AND LEARNERS: THE CASE OF EASTERN PROVINCE, ZAMBIA

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ABSTRACT

Article History

Received: 14 January 2019

Revised: 22 February 2019

Accepted: 2 April 2019

Published: 29 May 2019

Keywords

Factors
Influencing
Learner-Performance
Science
School administrators
Teachers
Learners.

This study investigated the factors that contribute to poor performance in science among grade 9 and 12 learners in the Eastern province of Zambia. The study employed a cross-sectional research design involving 137 participants attending the Zambia Association for Science Education (ZASE) Eastern Provincial Conference held in February 2019 and 74 (24 boys, 50 girls) grade 12 learners. Data were collected using open-ended questions that participants discussed in groups before presenting their findings at the conference. Data were also collected using a document analysis of the Eastern Province Strategic Plan for 2018 - 2021. The data were analysed using thematic qualitative methods and while other data were quantified for further analysis. The findings indicated that factors that influence performance in science fell into six categories namely (a) Administrative (b) Teacher (c) Learner (d) Time allotted to science teaching and learning (e) Assessment and (f) Curricular factors. More specifically, the study revealed that lack of resources such as laboratory apparatus, inadequate preparation by teachers, irregular assessment and a lack of adequate scientific knowledge were among factors that contribute to poor performance in science by learners. The study also revealed that conducting practicals, enhancing assessment, motivating learners and providing teaching and learning materials can improve learner performance in science. Therefore, it is recommended that stakeholders follow-up on the proposed strategies in order to improve learner performance in science. Further, action research needs to be conducted focusing on addressing teacher and learner factors that influence performance in science subjects.

Contribution/Originality: This study contributes to the existing literature on the factors that influence performance in science subjects among learners. The study is unique in that it brings together the views of School Administrators, Teachers, and Learners and proposes a model for improving learners' performance in the sciences.

1. INTRODUCTION

1.1. Background

In a world that is increasingly shaped by science and technology, it is imperative for everyone to access quality science education. As such, many countries across the globe have embraced science education in their curricula. Stressing the importance of science education, Olasehinde and Olatoye (2014) assert that science education is designed to guide the world toward a scientifically literate society and this is important for an understanding of science, personal fulfillment and excitement. Further, the European Commission (2015) reports that knowledge of and about science are integral to preparing our population to be actively engaged and responsible citizens, creative and innovative, able to work collaboratively and fully aware of and conversant with the complex challenges facing

society. Overall, science education equips learners with scientific skills which are necessary for solving the ever-evolving socio-scientific problems. In view of the importance of science education and need to provide access to science education, in Zambia, two science subjects are offered at Junior secondary school namely; Integrated Science and Agricultural Science while at the Senior secondary school level, five science subjects are offered namely; Biology, Science (combined Chemistry & Physics), Physics, Chemistry and Agricultural Science (MESVTEE, 2013).

However, performance in science subjects has been poor in many parts of the world, and Zambia is not an exception. As such, this has become a matter of serious concern among various stakeholders including researchers, school administrators, teachers, learners, and parents. For example, many researchers have been concerned about the poor performance in science, and efforts to identify and address major influencing factors are made almost on a daily basis. Consequently, a number of research studies related to learner performance in science subjects have been conducted both in Zambia and abroad.

1.2. Factors Influencing Learner Performance in Sciences

Many studies have been conducted to investigate the various variables that influence learner performance in the sciences. For example, a study by King'aru (2014) sought to investigate factors that contribute to poor performance in science subjects among students in secondary schools in Tanzania. The study showed that factors that contribute to poor performance in science include poor teaching methodologies in science education, negative attitude towards science subjects among students and lack of resources such as textbooks and well-equipped laboratories.

Another study by Ngema (2016) conducted in South Africa investigated factors that cause poor performance in order to make efforts to improve the science pass-rates in secondary schools. The results indicated that factors that contribute to poor performance are; change in the curriculum, the time allocated for each science topic, the teachers' teaching load, resources, the educators' lack of specialized content knowledge, the medium of instruction, the involvement of the parents, poverty, and motivation.

A study by Monde (2012) compared the performance between urban Grade 9 school pupils and rural Grade 9 school pupils in the Junior Secondary School Leaving Examinations in basic schools in Senanga District province of Zambia and investigated the factors which affected their performance. The study revealed that the performance of urban and rural Grade 9 school pupils in Junior Secondary School Leaving Examinations was generally poor. The poor performance of the Grade 9 pupils was attributed to factors such as lack of qualified teachers, shortage of Grade 9 school teachers, long distance to and from school, lack of homework, insufficient learning materials and lack of library facilities.

A study by Chileya (2016) investigated the factors that affected the poor academic performance of pupils in junior secondary leaving examinations in selected day secondary schools in Mwense District, Luapula province of Zambia. The study showed that the factors affecting poor academic performance of pupils in junior secondary school leaving examinations in selected day secondary schools were teacher/pupil absenteeism, lack of teacher/pupil motivation in schools, inadequate internal and external teacher monitoring in schools, abnormal teacher workload, non-parental involvement in the learning process of their children, late reporting for lessons by both teachers and pupils, schools and communities working in isolation, inadequate syllabi coverage, inadequate qualified human resource, insufficient teaching and learning materials in selected day secondary schools.

Mwaba (2011) conducted a study to investigate the low performance of female pupils in physical science at Serenje Technical High School Academic Production Unit, Zambia. This study revealed that lack of skilled manpower, lack of resource books, lack of teaching materials and laboratory apparatus, the language of science, beliefs, and misconceptions are among factors that influence the performance of girls in physical sciences.

In a study conducted to explore factors affecting performance in biology 5090 at selected high schools in Lesotho, Mamalanga and Awelani (2014) concluded that the possible factors responsible for

the poor performance included lack of financial support, lack of equipped libraries, lack of laboratories and Biology textbooks, method of teaching and accessing Biology 5090.

In Nigeria, a study was conducted by Ojukwu (2016) to investigate the perception of students on the causes of their poor performance in external chemistry examinations in Umuahia North Local Government Area of Abia State. The study found that the students' perceived causes of poor performance were; the teachers' educational qualifications, their methods and strategies of teaching, their failure to use of instructional materials and their teaching experience, low retention of learned materials by the students, inadequate coverage of the syllabus, non-conduct of practical's and lack of knowledge of the subject matter. These findings support (Barineka, 2012) who found that some of the variables that may be responsible for poor performance in chemistry may be curriculum and instructional materials related variables.

Mukhwana (2013) studied the student-related factors that influence the performance of students in Biology in Kenya Certificate of Secondary Education in Eldoret municipality. The study found that student-related factors affecting performance of Biology: primary school Science which provides a requisite background for Biology at secondary school level; interest in Biology (theory and practical) provides which provides a force for learners to participate in the learning process; their ability to carry out the practical effectively, and students' ambition and attitudes.

However, there is no known research conducted to establish the factors that influence learner performance in science in the Eastern province of Zambia. Further, from the above studies, no study collected the views of school administrators, teachers, and learners. It is this gap that this study sought to fill by investigating the factors that influence poor performance in science from the point of view of school administrators, teacher, and learners.

1.3. Problem Statement

Many studies have been conducted to research the variables that affect or influence the performance of learners in science subjects. However, there seems to be a lack of documented literature on factors contributing to poor performance in sciences at grades 9 and 12 in the Eastern Province of Zambia. This is regardless of the poor performance that sciences continue to record in the Examinations Council of Zambia based examinations (Examinations Council of Zambia, 2018). Further, the Eastern Provincial Education Office (PEO) has observed that despite the various in-service training programs, seminars, and workshops organized for teachers at school, zonal, district, provincial and national levels, learners' performance in sciences has been poor (Provincial Education Office, 2019). In view of the above, this study sought to fill this knowledge gap by investigating the factors that influence poor learner-performance in science at grades 9 and 12, from the point of view of administrators, teachers, and learners.

1.4. Purpose of the Study

This study sought to investigate the factors that influence poor learner-performance in science at grades 9 and 12, from the point of view of administrators, teachers, and learners.

1.5. Research Questions

The study sought to answer the following questions;

1. What factors contribute to the poor performance of grades 9 and 12 learners in science?
2. What strategies can be used to improve the performance of grades 9 and 12 learners in science?

1.6. Conceptual Framework

The study was based on the assumption that knowledge of the factors that influence poor performance among learners is the first step to addressing the problem. Once the factors are established, appropriate measures or

strategies would be proposed and implemented in order to solve the problem of performance. This ought to take the systems' approach with all stakeholders being equally important in improving learner performance. Therefore, a 5-stage cycle was proposed for addressing poor performance in science. The five stages are outlined below;

a. Identifying the Problem

At this stage, stakeholders should contribute to identifying the problem. In this case, the problem was 'poor performance in sciences' at both grade 9 and 12.

b. Identifying the Causes of the Problem

This should involve an honest introspection and acceptance of responsibility by all stakeholders. At this stage, the blame game would not yield the desired results. Therefore, all stakeholders need to identify causes that would be directly under their control.

c. Proposing Strategies for Solving the Causes of the Problem

This stage involves the proposal of strategies for solving the problem and setting of the desired outcome (targets). The proposed strategies for solving the problem must address the causes of the identified problem and must outline precise actions to be taken. Stakeholders need to identify what they can do differently and better in order to solve the identified problem. The proposed strategies need to be Specific, Measurable, Achievable, Realistic and Time-bound (SMART) if desired results are to be achieved.

d. Implementing the Proposed Strategies for Addressing the Problem

Stakeholders need to then begin implementing the strategies that are specific to each one of them. This stage needs to be continuously monitored and modifications made as and when necessary.

e. Evaluating the Obtained Outcome

This involves evaluating the obtained results against the set targets. If the desired outcome is not achieved or there is a need for further improvement, the cycle would start over again. The proposed stages are summarised in Figure 1 below.

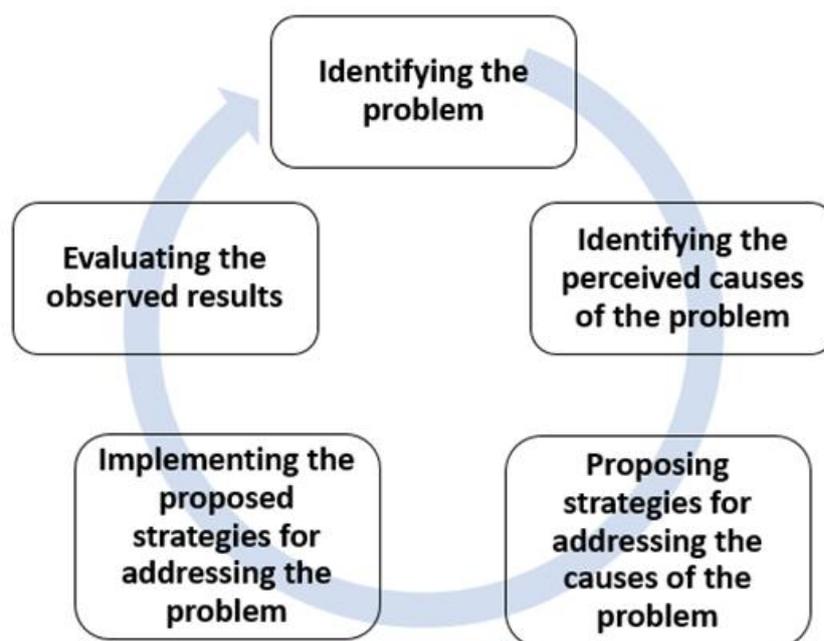


Figure-1. Conceptual Framework – for improving learner performance.

1.7. Significance of the Study

The study is important for all stakeholders that have an interest in improving learner performance in science. It has the potential to influence decision making by teachers, learners, school administrators, parents and government institutions, and non-governmental organisations. The study has the potential to reveal factors that cause poor learner performance in science, which can be used as a basis for finding ways of improving the overall learner performance. The study provides stakeholders (school administrators, teachers, learners, etc.) with information that could be used to improve the teaching and learning process in order to improve academic performance in sciences. The study also adds to the existing body of knowledge on factors that cause poor learner performance in the sciences. Further, the study acts as a precursor to researchers who would be interested in improving learner performance in sciences by addressing one or more of the factors that may arise from the findings of the study. Lastly, the study proposes a 5-stage cycle for addressing poor learner performance in the sciences.

1.8. Limitations

The study was limited in that the sample only comprised teachers and administrators drawn from across Eastern province that attended the Zambia Association for Science Educators (ZASE) conference at Nyimba Boarding Secondary School in February 2019 and learners enrolled in grade 12 at Nyimba Boarding Secondary School in 2019. Further, the study only focused on factors influencing performance in sciences among grade 9 and 12 learners. The study was also limited in that the researcher no control over what information would be provided or withheld by the participants. However, the findings of the study provide a framework for a closer look at the factors that influence learner-performance and strategies for improving performance.

2. METHODOLOGY

2.1. Research Design

The study adopted a cross-sectional research design by collecting data needed to answer the research questions. Some of the data that were collected were quantified for easier analysis while qualitative data were analysed narratively.

2.2. Sampling Procedures

The study adopted a purposive sampling procedure, by selecting participant who attended the Zambia Association of Science Educators (ZASE) provincial conference for Eastern Province held at Nyimba Boarding Secondary School from 11th to 14th February 2019 and learners from Nyimba Boarding secondary school. The sample, therefore, comprised 137 participants drawn from across the province including Headteachers/Deputy Headteachers, Science teachers, and Head of departments (HODs), and 74 (24 boys, 50 girls) grade 12 learners.

2.3. Ethical Consideration

Participants were informed of their involvement in the study and that the data collected would be documented and used for purposes of improving the teaching and learning of science. Participants were also informed that the information collected would be treated anonymously.

2.4. Instrumentation

The researcher used open-ended discussion questions to collect data from the participants. The participants were asked to answer the following questions in groups;

1. Who is to blame for the poor performance in science subjects?
2. What can we do differently and better to improve learner performance in science subjects?

2.5. Procedures

Phase 1: Question: Who is to blame for the poor performance in sciences?

1. Participants were divided into groups consisting of Administrators (Headteachers/ deputy Headteachers), and Heads of department and Teachers. They answered the question ‘*who is to blame for the poor performance of learners?*’
2. Two grade 12 classes at Nyimba boarding were randomly selected to be part of the study, they comprised 24 boys and 50 girls, giving a total of 74 learners.
3. The groups (and the two selected classes) were asked to answer the question above in their respective groups.
4. After about 30 minutes, the groups convened and made presentations of their findings which were later submitted to the researcher for analysis.

Phase 2: Question: What can we do differently and better to improve learner performance in science subjects?

5. To collect data regarding the strategies that can be used to improve science results, the participants were asked to form six groups and asked to answer the question above and later make presentations of their findings.
6. The researcher also used document analysis, involving the analysis of the Eastern Provincial Strategic Plan for 2018 – 2019.

2.6. Data Analysis

The data collected were analysed by adopting both quantitative and qualitative procedures. The quantified data were summarised and presented by frequency tables while Qualitative data were analysed qualitatively by searching for themes and trends emerging in the data and presented narratively. Frequencies and simple percentages were used to analyse the quantitative data which were later presented using a frequency table. In order to compute percentages, the formula below was used;

$$\text{Percentage (\%)} = \frac{\text{Frequency score}}{\text{Total number of groups}} \times 100$$

3. FINDINGS

3.1. Factors Contributing to the Poor Performance of Learners in Science at Grades 9 and 12

The factors that contribute to the poor performance of learners in science at grades 9 and 12 were collapsed into six (6) categories namely (a) Administrative (b) Teacher (c) Learner (d) Time allotted to science teaching and learning (e) Assessment and (f) Curricular, see Table 1.

(A) Administrative Factors

The factors that fell under this category included lack of resources such as books, laboratory apparatus, lack of qualified teachers of science, lack of motivation of teachers and administrators, and transfer of teachers without replacement.

(B) Teacher Factors

The following teacher factors influence poor performance in science subjects at grade 9 and 12; lack of preparation for lessons, lack of explanations of notes, late coming by teachers, teachers being too fast when teaching, teacher absenteeism, and rudeness in some cases. Other factors are lack of measures by teachers to assist low performing learners and teachers’ lack of measurable or visionary objectives.

(C) Learner Factors

Learner factors that cause poor performance in science subjects include poor motivation to engage in science lessons, failure to follow instructions, poor spelling and handwriting, poor sentence construction and poor sequencing of answers.

Table-1. Summary of Factors That Influence Learner Performance in Science.

Factor (Category)	Example
1. Administrative	<ul style="list-style-type: none"> • Lack of resources • Lack of qualified teachers • Lack of laboratory apparatus • Lack of textbooks • Lack of motivation for teachers • Transfers without replacement
2. Teacher	<ul style="list-style-type: none"> • Lack of preparation for lessons, • Lack of explanations of notes, • Late coming by teachers, • Teachers being too fast when teaching, • Teacher absenteeism, and rudeness in some cases. • Lack of measures by teachers to assist low performing learners • Lacking measurable or visionary objectives.
3. Learner	<ul style="list-style-type: none"> • Poor motivation to engage in science lessons, • Failure to follow instructions, • Poor spelling and handwriting, • Poor sentence construction and • Poor sequencing of answers.
4. Time allotted to teaching/ learning	<ul style="list-style-type: none"> • Biology – 6 periods per week • Physics – 6 periods per week • Chemistry – 6 periods per week • Agricultural Science – 6 periods per week
5. Assessment	<ul style="list-style-type: none"> • Lack of administration of end of topic tests, exercises and homework. • Delayed or lack of feedback given to learners • Book-lifted test questions • Lack of policies on homework, continuous assessment, and remedial work
6. Curricular	<ul style="list-style-type: none"> • Frequent changes in curricula or syllabi

(D) Time Allotted to Science Lessons

Participants were of the view that the time allotted to science lessons was not enough resulting in noncompletion of syllabi.

(E) Assessment

With regard to assessment, there is a lack of administration of end of topic tests, exercises and homework. Where these are given, there is delayed or lack of feedback given to learners on their performance in these tasks. In some cases, test questions are simply recycled from previous tests, examinations or book-lifted from reference books. Lack of policies on homework, continuous assessment, and remedial work, and where these existed, there were no institutionalized steps to reinforce the policies.

(F) Curricular

The last category of factors that influence poor learner performance was curricular. Particularly, the stakeholders stated that frequent changes in the curriculum affected performance by learners.

3.2. Strategies for Improving Learner Performance in Sciences at Grades 9 and 12

To collect data regarding the strategies that can be used to improve science results, the participants were asked to form six groups and asked to answer the question ‘*What strategies can be used to improve results in science subjects?*’ and later make presentations. Table 2 shows the factors that were mentioned by at least two of the six groups. The most frequently mentioned strategies were; enhancing the conduct of practicals during lessons (100%), enhancing assessment (83.3), enhancing CPD meetings and motivating learners (66.7%).

Table-2. Strategies for improving learner performance in science subjects.

Strategy	Mentioned Freq. (%)	Not mentioned Freq. (%)	Total Freq. (%)
1. Enhancing conduct of practicals	6 (100)	0 (0)	6 (100)
2. Enhancing assessment e.g. tests, exercises, quizzes, homework, standard questions.	5 (83.3)	1 (16.7)	6 (100)
3. Enhance CPD meetings	4 (66.7)	2 (33.3)	6 (100)
4. Motivating learners	4 (66.7)	2 (33.3)	6 (100)
5. Provide teaching and learning materials e.g. apparatus, laboratory manual	3 (50)	3 (50)	6 (100)
6. Identify slow learners and administer remedial work	3 (50)	3 (50)	6 (100)
7. Effective planning for lessons	2 (33.3)	4 (66.7)	6 (100)
8. Control class enrolment	2 (33.3)	4 (66.7)	6 (100)
9. Motivating teachers	2 (33.3)	4 (66.7)	6 (100)

4. DISCUSSION OF THE FINDINGS

The findings of the study have implications for all stakeholders – school administrators, teachers, learners, parents, and decision-makers in government institutions.

4.1. Factors Contributing to the Poor Performance of Learners in Science at Grades 9 and 12

The findings indicate that there are a number of factors that influence the performance of learners in science subjects at grades 9 and 12. These factors include (a) Administrative (b) Teacher (c) Learner (d) Time allotted to science teaching and learning (e) Assessment and (f) Curricular. These findings have implications for all stakeholders.

The findings that there is a lack of teaching and learning materials such as books and laboratory influence poor performance of learners in science subjects are similar to findings by King’aru (2014), Ngema (2016), Chileya (2016), Mwaba (2011) and Mamalanga and Awelani (2014). Implications are that teachers are not able to make science material accessible by learners in meaningful ways due to the lack of resources. A lack of books means that learners may not have materials from which to access scientific knowledge and hence have to rely on teachers’ notes. It also means that learners may not read ahead of the teacher, moreover, reading ahead of the teacher is important in making learners ready for learning as it creates advance organisers on which further learning depend (Ausubel, 1968). The lack of laboratory apparatus in most schools impedes the learning of science as science ought to be taught and learned mainly through practicals and experiments. However, Mapulanga and Chituta (2018) found that of 11 teachers surveyed, 8 teachers did not consider conducting experiments in a lesson on respiration, citing a lack of laboratory apparatus as the reason. As such teachers resort to using the passive, teacher-centered lecture-discussions.

The lack of qualified teachers of science in some schools also affects performance in the sciences, a finding that supports (Ojukwu, 2016) who found that teachers' qualification also influences the performance of learners in chemistry. It means that the teachers that would be handling science classes may not have sufficient scientific knowledge to teach intended knowledge and skills. In some cases, the ministry of education has employed individuals who are not trained teachers to teach science. The implication here is that until they upskill, such individuals may not possess sufficient pedagogical skills to meaningfully impart knowledge and skills to learners. The situation is worse in primary schools where most teachers of Integrated Science have only been seconded for the job and do not hold the minimum qualification to teach science.

The way science is taught by teachers also contributes to poor performance in this subject, this finding supports (Ojukwu, 2016). The findings show that in some cases teachers do not provide explanations and give notes that are not summarised. This may be linked to the fact that such teachers may not possess adequate scientific and/or pedagogical knowledge to be able to express the science concepts in a manner that learners may understand.

The finding that some teachers report late for classes and in some cases completely miss class is similar to findings by Chileya (2016). However, late coming and absenteeism by learners also influence their performance. This may contribute to the noncompletion of the syllabi which is another factor that was found to influence performance (Chileya, 2016). Noncompletion of the syllabus affects learners in that learners may be assessed in some content that they may not have learned either in class or outside.

Personal traits such as being rude on learners may also have an implication on learners' motivation to learn from such teachers and later on to consult from them. Obviously, this reduces the contact time that teachers have with the learners and hence impacts negatively on learning.

The lack of motivation of learners also influences poor performance in sciences, a result similar to the finding by Ngema (2016) this, in turn, results in poor attitudes towards science (King'aru, 2014). Motivation is an important factor in the learning process as it determines one's readiness to learn and how much time they can spend on-task. Usually, the learners who are motivated to learn will spend more time and energy on-task, and display positive attitudes towards learning. This, in turn, influences their comprehension and hence performance.

The study also found that poor performance is attributed to learners' challenges in their handwriting, spellings, and sequencing when trying to express scientific ideas. This may be a result of lack of understanding of science concepts and the language of science. Therefore, teachers need to adequately train learners on how to answer questions logically and use scientific language for them to maximize their scores in examinations.

The other factor that was found to influence learner performance is limited time allotted to science classes, this finding is similar to the finding by Ngema (2016). This means that teacher-learner contact is reduced which in turn reduces coverage of the syllabus. The learners indicated that in some cases they only met their teachers twice per week. However, the syllabi recommend an allocation of a minimum of 5 x 40 minutes' periods per week for Biology and a minimum of 6 x 40 minutes' period per week for all other sciences (MESVTEE, 2013). If this were followed, pupils would be met a minimum of three times per week as opposed to the two times which they said was the case.

The other factor that leads to poor performance in sciences in Eastern province is the type and administration of the assessment. The results show that there are irregular assessment and delay in giving feedback to learners. In some cases, assessments in the form of homework are not given at all (Monde, 2012). This finding contradicts the recommendation by MESVTEE (2013) which places emphasis on the implementation of continuous assessment of various types. In view of the above, assessment should be done consistently while providing timely feedback to learners. Further, the assessment ought not to be limited to pen-and-pencil tests but also oral and practice tests.

Lastly, curricular factors that influence performance in science subjects include regular changes in the curricula or syllabi. Similarly, Ngema (2016) found that changes in the curriculum affect learner performance. This becomes a challenge when the teachers that are on the ground are not very comfortable with either the included or modified

aspects of the curriculum. In such cases, learners are never prepared enough to handle such aspects of the curriculum.

4.2. Strategies for Improving Learner Performance in Science Subjects

The study indicated that many strategies can be adopted to improve the performance of learners in science. These strategies are backed by other research studies. They include enhancing CPD meetings, conducting of practicals, regular assessments, motivating teachers and learners, provision of teaching/learning materials as well as effective planning and delivery of lessons. The finding that enhancing assessment through tests, exercises, and quizzes is in line with recommendations by the science syllabi (MESVTEE, 2013) while the finding that assessment through giving homework can improve performance is similar to the recommendation by Monde (2012). Further, learners ought to be exposed to standard questions at the level of examination questions. Through the 2018 - 2021 Strategic Plan, the Eastern Provincial Education Office advocates for strengthening assessment in order to enable learners adequately prepare for National Examinations, as well as acquire necessary skills and knowledge (PEO, 2019).

Motivating teachers and learners can also improve learners' performance as also asserted by King'aru (2014). This is because when motivated, both teachers and learners would increase their on-task time and effort and hence improve learner performance. The study also revealed that enhancing the conduct of practicals, providing teaching and learning materials such as laboratory apparatus and laboratory manuals would also improve learner performance, this result confirms claims by Mwaba (2011); Monde (2012) and King'aru (2014). Other strategies for improving learner performance include identifying slow learners and administering remedial work in order to increase acquisition of learned concepts. Teachers also need to effectively plan and deliver their lessons using appropriate strategies that engage learners in the learning process.

5. CONCLUSIONS AND RECOMMENDATIONS

Teaching and learning of science remain a critical subject in improving the access to scientific knowledge and hence successful livelihood in a science dependent society. It is therefore important that factors that contribute to poor performance in the science subjects are uncovered and solutions proposed in order to improve the performance of learners which is synonymous to access scientific knowledge. Therefore, this study sought to investigate the factors that influence poor performance in science among grade 9 and 12 learners in the Eastern province of Zambia from administrators, teachers, and learners' views. The findings indicate the factors that contribute to poor learner performance fall into six categories namely Administrative, Teacher, Learner, Time allotted to science teaching and learning, Assessment and Curricular factors. Based on these findings, the implementation and/or enhancement of the following measures are recommended in order to improve performance in science subjects;

1. Schools should enhance the conduct of Continuing Professional Development (CPD) meetings in order to enhance teachers' planning and delivery of science lessons.
2. Teachers of science should enhance the conduct of practicals during lessons so that learners can do more of the science, and hence learn more.
3. Enhancement and improvement of assessment criteria of the science learning process.
4. School administrators to ensure there is a continuous supply of the teaching and learning materials including books and laboratory apparatus.
5. Teachers should increase contact time with learners by avoiding unnecessary absenteeism and arranging for remedial activities outside the learning time, this would increase syllabi coverage.
6. Teachers should integrate learner-centered teaching approaches and ICTs in order to motivate learners and thus increase their learning opportunities.

7. Teachers should engage in action research studies focusing on teacher and learner factors that influence performance in science subjects.

Funding: This study received no specific financial support.

Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

Contributors/Acknowledgement: The researcher wishes to thank the following persons whose input saw the successful implementation and write-up of this work; Mr. Lawrence Nyirenda (Senior Education Standards Officer, Natural Sciences – Eastern province) and Mr. Jimmy Daka (ZASE Provincial Executive Chairperson) for facilitating the conduct of the study, Mr. Mumba Nkoloma (District Education Board Secretary – Petauke District – Eastern province) for his great input during data collection, and Ms. Rozaria Musaba (teacher of English language) for editing the article.

REFERENCES

- Ausubel, D., 1968. Educational psychology: A cognitive view. New York: Holt, Rinehart, and Winston.
- Barineka, N.J., 2012. Analysis of poor performance of senior secondary students in Chemistry in Nigeria. African Research Review, 6(4): 324-334. Available at: <https://doi.org/10.4314/afrr.v6i4.22>.
- Chileya, A., 2016. Factors affecting poor academic performance of pupils in junior secondary leaving examinations in selected day secondary schools in Mwense District Luapula Province. Dissertation. Lusaka, Zambia: University of Zambia.
- European Commission, 2015. Science education for responsible citizenship. Brussels: European Commission.
- Examinations Council of Zambia, E., 2018. Examinations performance review. Lusaka: Examinations Council of Zambia.
- King'aru, J.M., 2014. Factors contributing to poor performance of science subjects: A case of secondary schools in Kawe Division, Kinondoni Municipality. Dissertation. Tanzania: Open University of Tanzania.
- Mamalanga, C.L. and V.M. Awelani, 2014. Exploring factors affecting performance in Biology 5090 at selected high schools in Lesotho. Mediterranean Journal of Social Science (MCSER), 6(8): 271-278. Available at: <https://doi.org/10.5901/mjss.2014.v5n8p271>.
- Mapulanga, T. and D. Chituta, 2018. Evaluating secondary school Biology teachers' pedagogical content knowledge and grade 10 learners' understanding of respiration: Case of Chipata District, Zambia. American Journal of Educational Research, 6(10): 1438-1444. Available at: <https://doi.org/10.12691/education-6-10-1>.
- MESVTEE, 2013. . The Zambia education curriculum framework. Lusaka, Zambia: Central Depository Company.
- Monde, I., 2012. A comparative study of performance of grade 9 pupils in the junior secondary school leaving examinations in selected rural and Urban Basic Schools in Senanga District. Dissertation. Lusaka, Zambia: University of Zambia.
- Mukhwana, W.J., 2013. The role of student-related factors in the performance of biology subject in secondary schools in Eldoret Municipality, Kenya. Journal of Emerging Trends in Educational Research and Policy Studies, 4(1): 64-73.
- Mwaba, K., 2011. The performance of female pupils in physical science at serenje technical high school academic production unit (APU). Dissertation. Lusaka, Zambia: University of Zambia.
- Ngema, M.H., 2016. Factors that cause poor performance in science at ingwavuma circuit. Dissertation. South Africa: University of South Africa.
- Ojukwu, M., 2016. Perception of students on causes of poor performance in Chemistry in external examinations in Umuahia North Local Government of Abia State. International Journal of Education and Literacy Studies, 4(1): 67-73. Available at: <https://doi.org/10.7575/aiaac.ijels.v4n.1p.67>.
- Olasehinde, K.J. and R.A. Olatoye, 2014. A comparative study of public and private senior secondary school students' science achievement in Katsina State, Nigeria. Journal of Educational and Social Research, 4(3): 203-207.
- Provincial Education Office, 2019. Eastern province strategic plan for 2018 - 2021 Chipata: Provincial Education Office.

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